



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live.

Mitchell E. Daniels, Jr.
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November 3, 2006

Jeffery Langbehn
Lake County Solid Waste Management District
7820 Broadway
Merrillville, IN 46410

Dear Mr. Langbehn:

Re: Feddeler Landfill Information

IDEM has completed their initial review of the information you provided by e-mail on October 18, 2006, relative to the investigation conducted at the Feddeler Landfill

The documentation provided did not include information such as a sampling plan, field sheets or quality assurance / quality control information from the laboratory which would allow for validation of the sample results provided. As a result, the comments provided in this letter are based on the assumption that the laboratory data accurately represents the specific media sampled and analyzed.

The detection of hydrogen cyanide at 18 ppm by the field instrument on July 26, 2006, is a significant concern. However, of even greater concern is that the consultant detected 86 ppm hydrogen cyanide (which is above the limit established by NIOSH as being Immediately Dangerous to Life and Health (IDLH)) in the breathing zone on September 6, 2006, but it was not reported until IDEM received the table of sampling results on October 18, 2006. In the future, if you become aware of environmental conditions that may be injurious to human health, please call IDEM's emergency response line at 888/233-7745.

There was inadequate documentation to make any judgments relative to the accuracy of the field testing for toxic vapors. Information relative to calibration of the V RAE 5 gas meter and its range of accuracy was not provided. However, research by IDEM indicates that the accuracy of the V RAE 5 in detecting hydrogen cyanide is significantly compromised in the presence of hydrogen sulfide. It is also noted that the laboratory sampling of gas samples either did not include or did not detect hydrogen cyanide. IDEM is interested in seeing the results of EPA's air sampling from the site to verify whether hydrogen cyanide, or any other harmful emission, is being released by the landfill.

IDEM is also concerned with the installation of PZ-B and MW-A at the landfill. Based on the well logs it appears both of these wells may have been installed through the waste, through the clay protective layer beneath the site and into the locally utilized drinking water formation. This installation may have created a route for contamination from the landfill into the aquifer. In order

to assure that these wells do not represent a threat IDEM requests that the consultant involved with installation of the wells meet with staff to discuss the construction procedures that were utilized. If it cannot be demonstrated that the well construction protects the aquifer, the wells may need to be removed and the borehole safely plugged to protect the drinking water supply.

Monitoring wells MW-B and MW-C appear to be screened in the bottom of the landfill and are therefore sampling the leachate within the site. The sample results from these wells represent rainwater and moisture that has come into contact with the waste within the landfill and is perched on top of the clay beneath the disposal area. Such water would be expected to be contaminated and the results from these wells are within the range of characteristics for landfill leachate.

IDEM noted a clarification that should be made relative to a statement in the Executive Summary that indicated cyanide is a breakdown product of acrylonitrile. While this is a true statement, staff's research determined that cyanide is not formed unless the acrylonitrile is subjected to combustion or ingested by a living organism containing a specific enzyme and metabolized. It is unlikely that either of these conditions exist within the landfill.

Other than the indication that hydrogen cyanide may exist on the site, IDEM did not find any of the sampling results indicate the need for immediate action. However, IDEM continues to be concerned that the site has not been adequately closed and if proper closure is not performed, environmental damage could occur. Sampling of residential water wells by IDEM occurred last week and sampling of the monitoring wells associated with the site will occur in the near future to determine if any leakage from the site into the ground water is evident.

IDEM requests a meeting with the consultant involved with the field work at the Feddeler Landfill on behalf of the Lake County Solid Waste Management District to discuss their perspectives and understandings of the data gathered, as well as discuss the well installation referenced earlier. Representatives of the District are also welcome to attend the meeting. IDEM looks forward to coordinating future activities at the Feddeler Landfill with both the District and the Lake County Environmental Crimes Task Force.

If you have any questions please feel free to contact me at 317/233-6591.

Sincerely,

Bruce H Palin

Bruce H Palin
Assistant Commissioner
Office of Land Quality

cc: Short Elliot Hendrickson, Inc.
Rogelio "Roy" Dominguez
Congressman Visclosky
Senator Landske
Representative Lehe
Representative Kuzman
Michael Nelson
Stephen Henshaw

Executive Summary
Preliminary Investigation Activities
Feddeler C/D Landfill Site, Lowell, IN

Short Elliott Hendrickson, Inc. (SEH®), on behalf of the Lake County Solid Waste Management District (LCSWMD), has completed a preliminary investigation of the Feddeler Construction/Demolition (C/D) Landfill located in Lowell, Lake County, Indiana.

The Feddeler C/D Landfill operated from approximately 1971 to 2003 and encompasses approximately 40 acres. Agricultural fields are adjacent to the landfill to west, north, and east. An implement dealer and private residence are located south of the landfill. Bruce Ditch runs adjacent to the western and southern sides of the landfill and eventually discharges into the Kankakee River.

The preliminary investigation included the following activities:

- Initial site reconnaissance;
- Public records review;
- Landfill surface seep sampling/analysis;
- Bruce Ditch sediment and surface water sampling/analysis;
- Installation of groundwater monitoring wells and sampling/analysis;
- Landfill gas sampling/analysis; and
- Private water supply well sampling/analysis.

Initial site reconnaissance

During an initial site reconnaissance in April 2006, three landfill leachate seeps (liquid discharging from the landfill to the ground surface) were noted near the southern portion of the landfill. Stressed or dead vegetation was also noted adjacent to each seep. Evidence of 4-wheeler recreational trails on the site indicates that trespassing on the site may be occurring.

Public records review

SEH obtained/reviewed aerial photographs of the site, and performed a file review at the Indiana Department of Environmental Management (IDEM) in Indianapolis, IN. During its operation, the C/D landfill had been cited for numerous violations for not operating according to their permit. For example, on August 8, 1975, an inspection report from the State of Indiana Board Health Division of Sanitary Engineering reported numerous barrels of hazardous waste were being deposited into the C/D landfill. The drums allegedly contained acrylonitrile, a chemical that includes cyanide as a breakdown product. An August 2003 e-mail correspondence from IDEM to LCSWMD indicated that IDEM's files included documentation for a variety of hazardous chemical wastes that had been disposed in the landfill. Correspondence also indicates the landfill was not closed in accordance with IDEM requirements.

Review of limited data indicates that arsenic concentrations increased in two downgradient groundwater monitoring wells (MW2 and MW13) between 2000 and 2004. Results in 2004 indicate that the arsenic concentrations exceed the current national drinking water standard maximum contaminant levels (MCLs) of 10 ug/l for arsenic. The groundwater arsenic concentration in upgradient monitoring well MW1 also exceeds the MCL. MW1 is located immediately north of the landfill limits and may have been impacted by historical surface seeps or groundwater. Information contained in IDEM files reviewed by SEH did not

provide substantial evidence to indicate the groundwater arsenic concentration in MW1 is consistent with typical background groundwater concentrations.

Landfill Surface Seep Sampling/Analysis

In July 2006 five landfill seep locations were identified by the presence of actively flowing leachate and/or by stained soil and stressed/dead vegetation. One of the five seep locations was releasing leachate (Seep #1), while the remaining four were dry presumably due to lack of rainfall prior to the SEH site visit.

Liquid leachate samples were collected at Seep#1 and soil samples were collected at the other four seep locations. All samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), phenols, cyanide, and heavy metals.

Arsenic and lead in the Seep #1 liquid sample were detected in concentrations that exceed the IDEM closure values for industrial sites. Barium in the soil samples collected was found in concentrations that exceed the IDEM direct contact, migration to groundwater, and closure pathways.

Gas sampling and field monitoring in July and August 2006 indicated that at Seep #1, hydrogen cyanide and hydrogen sulfide gases were being emitted at concentrations higher than what is considered safe for short-term exposures. Field screening also indicated that acrylonitrile was present in the gas; however, subsequent laboratory analysis of the gas has not confirmed this.

It is reasonable to conclude that seeps from the Feddeler C/D Landfill represent historical and ongoing migration of contamination to groundwater, surface water, and adjacent surficial soils. Contaminants in the seep leachate may pose risks to human health and/or the environment. It is not unreasonable to conclude that the landfill gas poses a risk to human health and/or the environment, especially through inhalation near active seeps.

Bruce Ditch Sampling/Analysis

Sediment and surface water samples were collected at two locations in Bruce Ditch. The upstream sample location appeared to be a groundwater spring adjacent to the landfill, as the ditch was dry further upstream. The downstream sample was located downstream of the Seep #1 location. Samples were analyzed for VOCs, SVOCs, pesticides, PCBs, phenols, cyanide, and heavy metals.

Arsenic was detected in the upstream location sediment sample at levels that exceed the IDEM migration to groundwater pathway. At both locations, the cumulative sediment concentrations of SVOCs exceeded threshold effects concentrations for Consensus Based Sediment Quality Guidelines and may pose a potential risk to the environment. The surface water results had no EPA nor IDEM exceedances for the parameters analyzed.

Installation of Groundwater Monitoring Wells and Sampling/Analysis

In August 2006, three shallow groundwater monitoring wells and one piezometer were installed on the southern (downgradient) side of the landfill.

Groundwater samples were collected from each well and submitted to an off site laboratory for chemical analysis of VOCs, SVOCs, pesticides, PCBs, phenols, cyanide, and heavy metals. Laboratory results indicate that benzene, methylene chloride, arsenic, and lead are

present in groundwater at concentrations that exceed national drinking water standard maximum contaminant levels (MCLs).

Contaminants identified in the groundwater have the potential to migrate to downgradient private water supply wells and/or the Bruce Ditch and may pose a risk to human health and/or the environment.

Landfill Gas Sampling/Analysis

Landfill gas at Seep #1 and at the groundwater monitoring wells were screened with field instruments. Landfill gas screened at Seep #1 and at MW-B was found to contain concentrations of hydrogen cyanide and hydrogen sulfide higher than what is considered safe for short-term exposures. Methane concentrations at Seep #1 and MW-B were within the range considered to be explosive (if in the presence of oxygen and source of ignition). Field screening at Seep #1 indicated that acrylonitrile was present in high concentrations; however, subsequent laboratory analysis has not confirmed this.

Gas samples were collected from Seep #1 and at MW-B and submitted to an off site laboratory for chemical analysis. Several VOCs were detected in the landfill gas including benzene, toluene, xylene, vinyl chloride, trichloroethene, and tetrachloroethene.

It is reasonable to conclude that the landfill gas poses a risk to human health and/or the environment, especially through inhalation near active seeps and/or if explosive concentrations of methane were to migrate and collect beneath nearby structures. Additionally, the VOCs detected may partition from the gas phase to the underlying groundwater.

Private Water Supply Sampling/Analysis

Water was collected from the taps at two downgradient residences (Bales and Fritz) that use private wells. The water samples were analyzed at an offsite laboratory for VOCs plus acrylonitrile (vinyl cyanide), SVOCs, pesticides, PCBs, phenols, cyanide, and heavy metals. With the exception of arsenic and barium, none of the chemicals were detected in the water samples. Neither arsenic nor barium was present in concentrations exceeding the national drinking water standard maximum contaminant levels (MCLs).

There does not appear to be an immediate human health risk associated with consumption or contact with the water from the private well water supplies sampled.

No information regarding the depths of the private wells was reviewed. The future fate and transport of chemicals from the landfill to the private water supply wells is difficult to predict without a detailed evaluation of the water supply aquifer and its potential connection to the contaminated shallow groundwater in the vicinity of the landfill.

Contaminants of Potential Concern

Contaminants of potential concern at the landfill include, but may not be limited to: methane, hydrogen cyanide, hydrogen sulfide, VOCs, SVOCs, lead and arsenic. Methane, hydrogen cyanide, and hydrogen sulfide have been detected in landfill gas at the temporary wells and/or in the breathing zone in the vicinity of seep #1. A variety of VOCs were detected in both the landfill gas and in the groundwater collected from the temporary wells. A variety of SVOCs were detected in the seep leachate and in the ditch sediments. Lead was detected in leachate and monitoring well samples. Arsenic has been detected in seep leachate, seep soils, ditch sediments, and groundwater.

October 25, 2006

RE: Feddeler Landfill
Preliminary Investigation Results

SEH No. LCSWD0401.00 14.00

DRAFT

Ms. Jeanette Romano
Lake County Solid Waste Management District
7820 Broadway
Merriville, IN 46410

Dear Ms. Romano:

Short Elliott Hendrickson, Inc. (SEH[®]) has completed this letter report on behalf of the Lake County Solid Waste Management District (LCSWMD) to document the preliminary investigation results for the Feddeler Landfill located in Lowell, Lake County, Indiana.

This letter report summarizes the IDEM file review, preliminary investigation of several seeps noted on the landfill, and subsequent preliminary investigation activities which included: monitoring well installation, groundwater sampling, gas sampling, sediment sampling, and private potable well sampling.

Reference the workplan, and followup discussions.

Background

Insert text from Workplan letter.

IDEM File Review

Insert from Workplan letter.

Methods of Investigation for Phase 1

During the initial site reconnaissance on April 24, 2006, three active leachate seeps were noted near the southwestern portion of the landfill; however, during the July 26 sampling event the only actively flowing seep was the largest seep (Seep 1, see attached figure) on the southern edge of the landfill. Soil samples were collected at the two previously active seep locations (Seep 2 and 3), as well as at two additional locations. The two additional sampling locations were chosen based on soil staining, dead vegetation, and obvious drainage patterns.

One active leachate seep sample and four inactive seep soil samples were collected to assess the potential impacts of contaminants to the environment at the Feddeler Landfill. Seeping liquid from

the Seep 1 sampling location was allowed to collect in a small pool prior to being transferred to the appropriate collection jars via peristaltic pump. Soil sample locations were chosen based on Soil samples were collected from the dry seep locations labeled Seep 2, Seep 3, Seep 4, and Seep 5 were collected from the 0 to 4 inch below grade interval and were transferred to the appropriate collection jars. All liquid and soil samples collected were analyzed for volatile organic compounds (VOCs) plus acrylonitrile, semi-volatile organic compounds (SVOCs), pesticides, total phenols, total cyanide, Resource Conservation and Recovery Act (RCRA) metals including: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver, and polychlorinated biphenyls (PCBs). Samples were packed in ice and shipped to Test America in Watertown, WI via FedEx on July 27, 2006.

Field monitoring for toxic vapors including hydrogen cyanide, carbon monoxide, hydrogen sulfide, methane, oxygen concentration was conducted with a V RAE 5 gas meter and acrylonitrile was field monitored by using an acrylonitrile detecting Draeger tubes Seep 1. Gas bubbles were observed emerging from the Seep 1 pool sampling location. Hydrogen cyanide (HCN) was detected at 18 ppm, which is well above the OSHA permissible exposure limit (PEL) of 10 ppm, and the NIOSH recommended exposure limit (REL) of 4.7ppm. Acrylonitrile was also detected at a greater than 20 ppm concentration at this location. This concentration is well above the PEL (2ppm), REL (1ppm), and the OSHA short term exposure limit (STEL) of 10ppm. HCN has a gas density of 0.94 (air =1) which is less than air meaning that it essentially "floats" in air. Acrylonitrile on the other hand, has a gas density almost twice that of air (1.8) and therefore "sinks" in air and tends to accumulate in low lying areas. Hydrogen cyanide and acrylonitrile detections in the ambient vapors near Seep 1 by the field monitoring equipment indicate that volatile contaminants may exist at depth and are being volatilized to produce toxic vapors. The acrylonitrile detection tubes have cross sensitivities with 1000 ppm acetone, 20 ppm benzene, 1000 ppm ethanol, 1000 ppm ethyl acetate, 10 ppm ethylbenzene, and 1000 ppm hexane. Also, the acrylonitrile reading will be lower in the presence of butadiene.

Phase 1 Analytical Results

Sample results from Seep 1 indicate that arsenic and lead concentrations in the liquid leachate currently seeping is present in a concentration that exceeds the EPA maximum contaminant level (MCL), the concentration permissible at industrial facilities, and the concentration allowable at the time site closure would be granted by IDEM. The cyanide concentration found at Seep 1 is present at a concentration that exceeds its MCL, but is below the permissible levels for industrial sites and closure decisions. Low levels of volatile organic compounds (VOCs), Semi volatile organic compounds (SVOCs), barium, cadmium, chromium, and phenols, were found in the liquid at Seep 1, but were below the permissible limits set by IDEM and the EPA. See attached tables summarizing the laboratory analyses performed.

Soil sample results from the dry Seeps 2, 3, 4, and 5 indicate that the barium concentration in the soil at these seep locations exceeds the IDEM soil direct contact, migration to groundwater, and the default closure levels. Di-n-octyl phthalate, an SVOC was detected at a level below the permissible limits set by IDEM. Additionally low levels of the organochlorine pesticides methoxychlor and

dieldrin were detected. In addition, arsenic, cadmium, chromium, lead, and mercury were found above laboratory detection limits, but were below the permissible limits set by IDEM.

Next Steps in Investigation

Based on the information discovered during Phase 1 of the investigation, SEH and LCSWMD concurred that the following data collection was necessary to further assess contaminant presence/absence:

- Potable well sampling in downgradient (SE-SW) direction
- Additional monitoring wells and piezometer in downgradient direction not cut off by Bruce Ditch
- Ambient air screening for personnel (or others on site) safety
- Gas analysis of subsurface vapors and vapors being emitted at the Seep 1 location
- Sample Bruce Ditch surface water and sediments up and down gradient of seeps entrances

Methods of Investigation for Phase 2

SEH performed an additional phase of investigation at the Feddeler Landfill site on September 6, 2006. The activities included installation of groundwater monitoring wells and one piezometer, well development, collection of groundwater and surface water samples, collection of sediment samples, collection of landfill gas samples, potable well sampling, and monitoring site air conditions for health and safety purposes.

Three groundwater monitoring wells (MW-A, MW-B, and MW-C) and one nested piezometer (PZ-B) were installed near the south side of the Feddeler Landfill. These monitoring points were installed by SCS Environmental Contracting of Fort Wayne, Indiana under the direction of an SEH hydrogeologist. Soil borings were blind-drilled at each location using 4 1/4" inside diameter hollow stem augers. Approximate subsurface conditions were recorded on soil boring logs based on auger cuttings and drilling rates. Once obviously saturated soils were encountered, the borings were instrumented with monitoring wells equipped with 10-foot slotted PVC screens. The nested piezometer was instrumented with a five-foot slotted screen positioned approximately 15 feet below the nested well and was located approximately 5 feet west of MW-B. All monitoring points were fitted with above-ground locked protective casings. Soil boring logs and well construction documentation are attached. The locations of the monitoring points are depicted on the attached draft Figure.

Upon completion of well installation, the monitoring points were developed by removing several well volumes of groundwater from each well in order to remove suspended solids generated during well drilling. Well development consisted of surging the wells with a bailer and then purging water from the well. Once well development was completed, the wells were allowed to stabilize prior to sample collection.

Groundwater samples were collected from the three groundwater wells and one piezometer using disposable bailers. In addition, two surface water samples were collected from the intermittent creek located along the west side of the site. The sampling locations are provided on the attached figures. The groundwater and surface water samples were placed in laboratory provided bottles, appropriately preserved, and chilled to 4 degrees C. Chain-of-custody documentation was maintained throughout sample collection and shipment. The samples were delivered via overnight courier to Severn Trent Laboratories at three separate locations depending on the sample matrix in a given cooler.

Two sediment samples were collected from the bottom of the intermittent creek along the west side of the site. These samples were co-located with the surface water samples discussed in the previous paragraph. The sediment samples were collected from the upper six-inch layer of sediments by using sample dedicated disposable core samplers and by hand using disposable nitrile gloves. The sediment samples were placed in laboratory provided bottles, chilled to 4 degrees C., and delivered to Severn Trent Laboratories via overnight courier and standard chain-of-custody documentation.

Two landfill gas samples were collected from the site by SEH. One sample was collected from gas venting from well MW-B, and the second sample was collecting from gas venting from a point on the landfill surface. The gas discharge rate in MW-B was measured prior to sampling, and the landfill gas was then collected in a Summa canister at a flow rate equal to the discharge rate. The landfill gas at the Seep 1 location was collected by placing a large polyethylene funnel over the discharge and then collecting the sample from the top of the sealed funnel (discharge rate could not be measured at this location). The landfill gas samples were submitted to Severn Trent Laboratories for analysis. The location of Seep 1 is provided on the attached figure.

Two private potable wells located just south of the Feddeler Landfill were sampled by SEH during the field investigation. A potable water supply well serving a residence (consisting of a couple in their early 30s and one child approximately 9 months old) located at 10100 181st Street was sampled at a faucet within the residence. The faucet at this residence was after an in-line sediment trap that is part of the water supply system. The second well sampled supplies potable water to the Don Bales, Inc., an Implement dealer, located at 10102 181st Street. No traps or softeners were located between the faucet sampled and the well at this location. The potable water samples were placed directly in laboratory provided bottles, appropriately preserved, chilled to 4 degrees C, and delivered to Severn Trent Laboratories via overnight currier with standard chain-of-custody documentation.

During field activities, SEH monitored air conditions immediately adjacent to sampling points, as well as in the breathing zone using a V-Rae five-gas meter, and a photoionization detector (PID). The five-gas meter was used to monitor concentrations of hydrogen sulfide, hydrogen cyanide, methane, oxygen, and to monitor the explosivity of the gas. The PID was used to monitor relative concentrations of volatile organic compounds (VOCs). Hydrogen cyanide was detected at concentrations up to 5 instrument units (roughly equivalent to parts per million) in the breathing zone while installing well MW-B, piezometer PZ-B, and adjacent to the natural landfill gas seep.

Site personnel implemented "Level C" respiratory protection (air purifying respirators) when hydrogen cyanide was detected above background concentrations in the breathing zone. VOCs and much higher concentrations of hydrogen cyanide (>200ppm) were detected adjacent to boreholes during drilling operations. These concentrations are recorded on the attached soil boring logs.

Phase 2 Analytical Results

Samples collected from the three newly installed groundwater monitoring wells and one nested piezometer, surface water and sediment samples from Bruce Ditch, sediment samples from Bruce Ditch, and potable wells from Don Bales and Fritz Dorge properties were analyzed by Severn Trent Laboratories, Inc. for VOCs plus acrylonitrile, semivolatile organic compounds (SVOCs), Polychlorinated biphenyls (PCBs), organochlorine pesticides, cyanide, phenols, and the RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury). The two gas samples collected were analyzed for VOCs plus Acrylonitrile. Analytical Data and data in table format are attached.

Sample results from the three newly installed monitoring wells indicate that benzene, methylene chloride, arsenic, and lead are present in groundwater at concentrations that exceed the EPA maximum contaminant levels (MCL). Arsenic and lead are present in groundwater in downgradient monitoring well locations MW-A and MW-B at concentrations that exceed IDEM RISC levels for Industrial and Default Closure criteria. Additionally, low levels of semivolatile organic compounds (SVOC), organochlorine pesticides, PCBs, phenols, barium, chromium, and selenium are present in the groundwater on site, but are present below the permissible levels for industrial sites.

Surface water samples were collected from two locations along Bruce Ditch. The northern-most sample was collected from a location labeled "North Ditch." This sample was collected from an artesian spring found flowing on September 9, 2006. The southern sample labeled "South Ditch" was sampled down stream from the Seep 1 location. Results from these samples do not indicate EPA MCL or IDEM RISC level exceedances for any substance we analyzed for. Arsenic was below the laboratory's detection limit at both locations. Lead was below its detection limit at the North Ditch location, and was below its MCL and IDEM RISC level at the South Ditch location. Gamma-BHC, naphthalene, PCBs, phenols, barium, and chromium, are present in the surface water on site, but are present below the permissible levels for industrial sites. Additionally, no VOCs were detected at either ditch location.

Sediment samples were collected from the ditch sample locations after the water was collected to minimize turbulence. Several SVOCs, VOCs, organochlorine pesticides, PCBs, phenols, barium, chromium, lead, and mercury were detected in concentrations below IDEM RISC values for Industrial sites. Arsenic is present in the North Ditch sediment sample at a concentration that exceeds the IDEM Migration to Groundwater and Default Closure Pathways. An elevated level of Arsenic is also present in the South Ditch sediment sample, but the concentration is below the IDEM permissible levels.

The gas samples collected from the Seep 1 location and from the MW-B location contained potentially lethal concentrations of both hydrogen cyanide and hydrogen sulfide, and explosive amounts of methane based on field monitoring equipment. Laboratory analysis of the gas samples indicates that many VOCs are present at levels below NIOSH and OSHA levels.

Laboratory from the Don Bales Inc. property potable well indicate that arsenic is present, however at concentrations below the MCL drinking water standards. Low levels of barium were also detected in the Fritz well and Bales well.

DISCUSSION

Based on historical analytical data from the IDEM file review, the arsenic levels found adjacent to the landfill and in the Don Bales potable well may not be naturally occurring background concentrations. Several downgradient monitoring wells (MW-2, MW-7, MW-9, MW-10, (MW-12, MW-13, and MW-14 are not on our site features map)) show that arsenic levels are below laboratory detection limits; however, these wells may be hydrogeologically cut off from the landfill contamination by Bruce Ditch. Also, two other monitoring wells that are not hydrogeologically cut off from Bruce Ditch (MW-8, which is likely locally downgradient, but regionally upgradient and MW-6, which is likely locally and regionally downgradient and not cutoff by Bruce Ditch) had levels of arsenic (14 µg/l and 13 µg/l, respectively during the June 2000 sampling event conducted by Weaver, Boos, and Gordon, Inc.) that exceed the current EPA MCL, industrial, and Default Closure Levels for industrial sites. Additionally, Seep 1 leachate; Seep 2, Seep 3, Seep 4, and Seep 5 soil samples; North Ditch and South Ditch sediment samples all have high arsenic concentrations.

DRAFT

BAL//MJB

C:

SMITH, JANET

From: Clifford E. Duggan, Jr. [cduggan@lcswwmd.com]
Sent: Wednesday, October 18, 2006 11:56 AM
To: PALIN, BRUCE
Subject: Fw: Feddeler LF #1e-mail

Attachments: Feddeler existing MW locations.pdf; Feddeler existing MW and boring info.pdf



Feddeler existing
MW locations...



Feddeler existing
MW and borin...

Mr. Palin,

At the request of Jeff Langbehn you will receive four separate e-mails with attachments regarding the testing at the Feddeler Landfill. Three of the e-mails will be forwarded from Cliff Duggan's e-mail and one from Jeanette Romano's e-mail. We will also overnite the information to you as well. If you experience problems with the e-mails please let us know.

Thank you,
Jeanette Romano
Lake County SWMD
219-769-3820

----- Original Message -----

From: "Clifford E. Duggan, Jr." <cduggan@lcswwmd.com>
To: <purdeydog@aol.com>
Sent: Tuesday, October 17, 2006 7:00 PM
Subject: Fw: Feddeler LF

>

> ----- Original Message -----

> From: "Mark Broses" <mbroses@sehinc.com>
> To: <srhenshaw@aol.com>; "Doug Bach" <dbach@sehinc.com>
> Cc: <cduggan@lcswwmd.com>; <jlangbehn@lcswwmd.com>; <jromano@lcswwmd.com>;
> "Kerry Keith" <kkeith@sehinc.com>
> Sent: Tuesday, October 03, 2006 10:34 AM
> Subject: Re: Feddeler LF

>

>

>> Per request from Doug Bach, attached is a summary of the information we
>> have on the previously installed monitoring wells.

>>

>> Our May 2006 review of IDEM files only produced boring logs for MW1, MW6,
>> MW12, and MW 13. I suspect that Weaver Boos would be able to fill in
>> the
>> missing information on the other boring logs if needed in the future.

>>

>> Additionally, a couple observations regarding

>>

>> Arsenic

>> 1. Seep soil concentrations exceed the IDEM "migration to groundwater"
>> closure levels (see Table 3),

>> 2. Seep #1 leachate concentration was 87 ug/l (see Table 2)

>> 3. Highest groundwater concentration detected was at new temp well MW-B
>> at 38.8 ug/l, and at MW-A at 16.8 ug/l. (see Table 6). These
>> wells

>> are in vicinity of Seep#1.

>> 4. IDEM's June 30, 2004 e-mail observation that arsenic "was in
>> upgradient

>> wells also" may not mean the arsenic is typical of background. Seeps

>> around the landfill contain arsenic, and potential historical seeps to
>> the
>> north may have contributed to the arsenic detected at MW-1 (which is
>> fairly
>> close to the north edge of the landfill).
>> 5. Although the data is very limited, comparison of June 2000 data to
>> May
>> 2004 data indicates that arsenic concentrations increased in downgradient
>> wells MW2 and MW13. (see attachment).
>>
>> (See attached file: Feddeler existing MW locations.pdf) (See attached
>> file:
>> Feddeler existing MW and boring info.pdf)
>>
>>
>

REFER

TO

PHOTO:

A

Summary of Existing Monitoring Well Data
(from May 2006 SEH review of IDEM files)

[illegible]

BORING LOG: MW-1

PAGE 1 OF 4

PROJECT NAME: Feddeler Landfill
 PROJECT NUMBER: 9563-0030-70
 LOCATION: R & M Enterprises
 18501 Clark Road,
 Lowell, Lake County, Indiana
 DATE: 5/7/96
 LOGGED BY: John E. Greene (Cole Assoc.)
 WEATHER: Cloudy, 40-60°

DRILLING COMPANY: Top Flight
 DRILLER: Jeff Copak
 RIG TYPE: Mobile B-61
 DRILLING METHOD: Hollow Stem Auger
 BOREHOLE DIAMETER: 6 1/4"
 GROUND ELEVATION: 699.7'
 DEPTH TO WATER: 19.3'

TOTAL DEPTH: 82'
 WELL DIAMETER: 2" (PVC Riser & Screen)
 TOC ELEVATION: 702.80' Above MSL
 SCREENED INTERVAL: 27-32' (0.01" Slot)
 FILTER PACK INTERVAL: 25-32'
 BENTONITE INTERVAL: 22-25'
 GROUT INTERVAL: 1-22'

SAMPLE DATA						DESCRIPTION OF LITHOLOGY			GRAPHIC DIAGRAMS		
SAMPLE TYPE & NUMBER	SAMPLE DEPTH INTERVAL (FEET)	BLOW COUNTS	RECOVERY	PID (PPM)	OTHER SAMPLE DATA REMARKS (Munsell Color)	DEPTH (FEET)	DESCRIBE THE FOLLOWING: COLOR, GRAIN SIZE, MAJOR & MINOR CONSTITUENTS, STRUCTURES, RELATIVE DENSITY, CONSISTENCY, MOISTURE CONTENT	USCS SYMBOL	SAMPLE INTERVAL	LITHOLOGIC PROFILE	WELL CONSTRUCTION DIAGRAM
S-1	0-2	6/8	1.4'				Topsoil, Moist.				
		10/9					Orange-Brown with a Few Gray Mottles Silty CLAY, Trace Sand, Trace Gravel, Stiff to Very Stiff, Moist.	CL			
S-2	2-4	9/14	1.7'								
		15/3			(10YR 4/3-4)						
S-3	4-6	5/8	1.5'			5			5		
		12/15									
S-4	6-8	9/13	1.5'								
		18/20									
S-5	8-10	6/12	1.9'						10		
		16/19									
S-6	10-12	7/12	1.8'			10	-Charcoal Fragments				
		13/15									
S-7	12-14	5/11	1.7'				-Little Gravel				
		15/18									
S-8	14-16	5/6	1.5'			15			15		
		7/13					Brown Silty SAND, Trc. Gravel, Trc. Clay, Saturated	SM			
							Brown, Few Gray Mottles Silty CLAY, Moist.	CL			
S-9	16-18	4/6	1.2'				Gray Silty CLAY, Trace Sand, Trace Gravel, Stiff, Moist.	CL			
		7/13									
S-10	18-20	4/5	1.8'		(2.5Y 3/2)				20		
		8/8									
S-11	20-22	4/5	1.7'								
		5/8									
S-12	22-24	4/5	1.7'								
		8/11									
S-13	24-26	2/4	1.8'			25	Grayish Brn. Fine to Medium SAND, Trace Coarse Sand, Trc. Silt, Loose, Sat.	SP	25		
		2/7			(2.5Y 5-4/2)						
							Boring Continued on Page 2.				

COMMENTS:

SAMPLE INTERVAL



= Split Spoon Soil Sample

BORING LOG: MW-1

PAGE 2 OF 4

PROJECT NAME: Feddeler Landfill
 PROJECT NUMBER: 9563-0030-70
 LOCATION: R & M Enterprises
 18501 Clark Road,
 Lowell, Lake County, Indiana
 DATE: 5/7/96
 LOGGED BY: John E. Grcnc (Colc Assoc.)
 WEATHER: Cloudy, 40-60°

DRILLING COMPANY: Top Flight
 DRILLER: Jeff Copak
 RIG TYPE: Mobile B-61
 DRILLING METHOD: Hollow Stem Auger
 BOREHOLE DIAMETER: 6 1/4"
 GROUND ELEVATION: 699.7'
 DEPTH TO WATER: 19.3'

TOTAL DEPTH: 82'
 WELL DIAMETER: 2" (PVC Riser & Screen)
 TOC ELEVATION: 702.80' Above MSL
 SCREENED INTERVAL: 27-32' (0.01" Slot)
 FILTER PACK INTERVAL: 25-32'
 BENTONITE INTERVAL: 22-25'
 GROUT INTERVAL: 1-22'

SAMPLE DATA						DESCRIPTION OF LITHOLOGY			GRAPHIC DIAGRAMS		
SAMPLE TYPE & NUMBER	SAMPLE DEPTH INTERVAL (FEET)	BLOW COUNTS	RECOVERY	PID (PPM)	OTHER SAMPLE DATA REMARKS (Munsell Color)	DEPTH (FEET)	DESCRIBE THE FOLLOWING: COLOR, GRAIN SIZE, MAJOR & MINOR CONSTITUENTS, STRUCTURES, RELATIVE DENSITY, CONSISTENCY, MOISTURE CONTENT	USCS SYMBOL	SAMPLE INTERVAL	LITHOLOGIC PROFILE	WELL CONSTRUCTION DIAGRAM
S-14	26-28	2/2	1.8'		(2.5Y 5-4/2)		Grayish Brown Fine to Medium SAND, Trace Coarse Sand, Trace Gravel, Trace Silt, Loose to Medium Dense, Saturated.	SP			
		7/6									
S-15	28-30	8/11	2.0'								
		12/11									
S-16	30-32	2/3	0.9'								
		4/6									
S-17	32-34	6/8	2.0'								
		17/24									
S-18	34-36	4/10	1.8'								
		18/29									
S-19	36-38	9/11	2.0'								
		15/18									
S-20	38-40	6/9	1.8'								
		11/17									
S-21	40-42	8/11	1.0'				Gray Silty CLAY, Trace Sand and Gravel, Very Stiff, Moist.	CL			
		17/18									
S-22	42-44	2/5	1.2'				Gray Fine to Coarse SAND, Trace Gravel, Loose to Medium Dense, Saturated.	SP			
		7/10									
S-23	44-46	17/23	2.0'				Gray Fine SAND, Trace Medium Sand, Loose, Saturated.	SP			
		28/30									
S-24	46-48	10/10	2.0'								
		16/13									
S-25	48-50	7/4	1.7'		(2.5Y 5-4/2)						
		6/10									
							Dark Gray Silty CLAY, Trace Sand, Very Stiff, Moist.	CL			
							Boring Continued on Page 3.				

COMMENTS:

SAMPLE INTERVAL

 = Split Spoon Soil Sample





PROJECT NAME: Feddeler Landfill
 PROJECT NUMBER: 9563-0030-70
 LOCATION: R. & M. Enterprises
 18501 Clark Road,
 Lowell, Lake County, Indiana
 DATE: 5/7/96
 LOGGED BY: John E. Greene (Cole Assoc.)
 WEATHER: Intermittent Rain, 40-60°

BORING LOG: MW-1

PAGE 3 OF 4

DRILLING COMPANY: Top Flight
 DRILLER: Jeff Copak
 RIG TYPE: Mobile B-61
 DRILLING METHOD: Hollow Stem Auger
 BOREHOLE DIAMETER: 6 1/4"
 GROUND ELEVATION: 699.7'
 DEPTH TO WATER: 19.3'

TOTAL DEPTH: 82'
 WELL DIAMETER: 2" (PVC Riser & Screen)
 TOC ELEVATION: 702.80' Above MSL
 SCREENED INTERVAL: 27-32' (0.01" Slot)
 FILTER PACK INTERVAL: 25-32'
 BENTONITE INTERVAL: 22-25'
 GROUT INTERVAL: 1-22'

SAMPLE DATA						DESCRIPTION OF LITHOLOGY		GRAPHIC DIAGRAMS			
SAMPLE TYPE & NUMBER	SAMPLE DEPTH INTERVAL (FEET)	BLOW COUNTS	RECOVERY	PID (PPM)	OTHER SAMPLE DATA REMARKS	DEPTH (FEET)	DESCRIBE THE FOLLOWING: COLOR, GRAIN SIZE, MAJOR & MINOR CONSTITUENTS, STRUCTURES, RELATIVE DENSITY, CONSISTENCY, MOISTURE CONTENT	USCS SYMBOL	SAMPLE INTERVAL	LITHOLOGIC PROFILE	WELL CONSTRUCTION DIAGRAM
S-26	50-52	10/8	1.7'				Gray Silty CLAY, Trace Sand, Very Stiff to Hard, Moist.	CL			
		13/14									
S-27	52-54	26/38	0.5'								
		50 for 4"					Light Brown Fine SAND, Trace Medium Sand, Trace Coarse Sand, Medium Dense to Dense, Saturated.	SP			
S-28	54-56	7/9	2.0'			55			55		
		10/17									
S-29	56-58	17/23	0.0'								
		26/36									
S-30	58-60	10/12	2.0'								
		26/18									
S-31	60-62	14/16	2.0'			60			60		
		20/21									
S-32	62-64	16/16	0.0'								
		23/31									
S-33	64-66	6/18	2.0'				Gray Silty CLAY, Trace Sand, Trace Gravel, Very Stiff, Moist.	CL			
		25/31									
S-34	66-68	15/16	1.5'								
		9/9									
S-35	68-70	7/8	1.2'								
		12/10									
S-36	70-72	1/8	0.0'			70			70		
		8/23									
S-37	72-74	7/8	2.0'				Grayish Brown Fine SAND, Trace medium to Coarse Sand, Medium Dense to Dense, Saturated.	SP			
		18/23									
S-38	74-76	6/10	0.0'								
		13/19				75			75		
							Boring Continued on Page 4.				

COMMENTS:

SAMPLE INTERVAL



= Split Spoon Soil Sample

BORING LOG: MW-1

PAGE 4 OF 4

PROJECT NAME: Feddeler Landfill
 PROJECT NUMBER: 9563-0030-70
 LOCATION: R & M Enterprises
 18501 Clark Road,
 Lowell, Lake County, Indiana
 DATE: 5/7/96
 LOGGED BY: John E. Greene (Cole Assoc.)
 WEATHER: Cloudy, 40-60°

DRILLING COMPANY: Top Flight
 DRILLER: Jeff Copak
 RIG TYPE: Mobile B-61
 DRILLING METHOD: Hollow Stem Auger
 BOREHOLE DIAMETER: 6 1/4"
 GROUND ELEVATION: 699.7
 DEPTH TO WATER: 19.3'

TOTAL DEPTH: 82'
 WELL DIAMETER: 2" (PVC Riser & Screen)
 TOC ELEVATION: 702.80' Above MSL
 SCREENED INTERVAL: 27-32' (0.01" Slot)
 FILTER PACK INTERVAL: 25-32'
 BENTONITE INTERVAL: 22-25'
 GROUT INTERVAL: 1-22'

SAMPLE DATA						DESCRIPTION OF LITHOLOGY			GRAPHIC DIAGRAMS		
SAMPLE TYPE & NUMBER	SAMPLE DEPTH INTERVAL (FEET)	BLOW COUNTS	RECOVERY	PID (PPM)	OTHER SAMPLE DATA REMARKS	DEPTH (FEET)	DESCRIBE THE FOLLOWING: COLOR, GRAIN SIZE, MAJOR & MINOR CONSTITUENTS, STRUCTURES, RELATIVE DENSITY, CONSISTENCY, MOISTURE CONTENT	USCS SYMBOL	SAMPLE INTERVAL	LITHOLOGIC PROFILE	WELL CONSTRUCTION DIAGRAM
S-39	76-78	6/10	1.5'				Grayish Brown Fine SAND, Trace Medium to Coarse Sand, Medium to Medium Dense, Saturated.	SP			
		13/19					Dark Gray Silty CLAY, Trace Sand and Gravel, Very Stiff to Hard, Moist	CL			
S-40	78-80	12/18	1.7								
		16/15									
S-41	80-82	8/11	2.0'			80			80		
		14/15									
							End of Boring at 82'.				
						85			85		
						90			90		
						95			95		
						100			100		

COMMENTS:

SAMPLE INTERVAL



- Split Spoon Soil Sample

PROJECT NAME: Feddeler Landfill
 PROJECT NUMBER: 9563-0030-70
 LOCATION: R & M Enterprises
 18501 Clark Road,
 Lowell, Lake County, Indiana
 DATE: 5/16/96 (Boring) & 5/17/96 (Well)
 LOGGED BY: Steve J. Winters
 WEATHER: Sun, 50-70°

BORING LOG: MW-6

PAGE 1 OF 2

DRILLING COMPANY: Top Flight
 DRILLER: Jeff Copak
 RIG TYPE: Mobile B-61
 DRILLING METHOD: Hollow Stem Auger
 BOREHOLE DIAMETER: 6 1/2"
 GROUND ELEVATION: 693.1'
 DEPTH TO WATER: 12.8'

TOTAL DEPTH: 32'
 WELL DIAMETER: 2" (PVC Riser & Screen)
 TOC ELEVATION: 695.97' Above MSL
 SCREENED INTERVAL: 26-31' (0.01" Slot)
 FILTER PACK INTERVAL: 24-31'
 BENTONITE INTERVAL: 20-24'
 GROUT INTERVAL: 1-20'

SAMPLE DATA						DESCRIPTION OF LITHOLOGY			GRAPHIC DIAGRAMS		
SAMPLE TYPE & NUMBER	SAMPLE DEPTH INTERVAL (FEET)	BLOW COUNTS	RECOVERY	PID (PPM)	OTHER SAMPLE DATA REMARKS (Munsell Color)	DEPTH (FEET)	DESCRIBE THE FOLLOWING: COLOR, GRAIN SIZE, MAJOR & MINOR CONSTITUENTS, STRUCTURES, RELATIVE DENSITY, CONSISTENCY, MOISTURE CONTENT	USCS SYMBOL	SAMPLE INTERVAL	LITHOLOGIC PROFILE	WELL CONSTRUCTION DIAGRAM
S-1	0-2	1/3	0.5'				Light Brown Silty CLAY, Trace Gravel, Soft to Medium Stiff, Moist.	CL			
		3/2									
S-2	2-4	3/7	1.5'		(10YR 4/3-4)		Brown with Gray Mottling Silty CLAY, Trace Gravel, Stiff to Very Stiff, Moist.	CL			
		11/14									
S-3	4-6	6/13	1.7'								
		18/16				5			5		
S-4	6-8	11/13	1.9'				Brown Silty CLAY, Trace to little Sand, Trace Gravel, Very Stiff to Hard, Moist.	CL			
		16/18									
S-5	8-10	11/13	2.0'								
		28/17									
S-6	10-12	13/21	1.0'		(2.5Y 3/2)	10	Gray Sandy, Silty CLAY, Trace Gravel, Occasional Shale Fragments, Hard, Moist.	CL	10		
		19/22					Gray Sandy, Silty CLAY, Trace Gravel, Hard, Moist.	CL			
S-7	12-14	10/11	1.2'				Gray Silty CLAY, Trace Sand, Trace Gravel, Stiff to Very Stiff, Moist.	CL			
		12/11					Gray Silty CLAY, Trace Sand, Trace Gravel, Stiff to Very Stiff, Moist.	CL			
S-8	14-16	7/5	1.6'			15	Gray Silty CLAY, Trace Sand, Trace Gravel, Stiff to Very Stiff, Moist.	CL	15		
		7/9									
S-9	16-18	5/8	0.7'		(2.5Y 3/2)		Dark Gray Sandy, Silty CLAY, Trace Gravel, Stiff, Moist.	CL			
		8/1									
S-10	18-20	4/5	1.4'				Gray Silty CLAY, Trace Sand, Trace Gravel, Stiff, Moist.	CL			
		7/9									
S-11	20-22	4/6	1.5'			20			20		
		7/8									
S-12	22-24	4/6	1.3'				Gray Sandy, Silty CLAY, Trace Gravel, Stiff, Moist.	CL			
		4/4									
S-13	24-26	4/7	1.6'			25			25		
		8/7									
					(2.5Y 3/2)		Boring Continued on Page 2.				

COMMENTS:

SAMPLE INTERVAL



= Split Spoon Soil Sample

BORING LOG: MW-6

PAGE 2 OF 2

PROJECT NAME: Feddeler Landfill
PROJECT NUMBER: 9563-0030-70
LOCATION: R & M Enterprises
18501 Clark Road,
Lowell, Lake County, Indiana
DATE: 5/16/96 (Boring) & 5/17/96 (Well)
LOGGED BY: Steve J. Winters
WEATHER: Sun, 50-70°

DRILLING COMPANY: Top Flight
DRILLER: Jeff Copak
RIG TYPE: Mobile B-61
DRILLING METHOD: Hollow Stem Auger
BOREHOLE DIAMETER: 6 1/4"
GROUND ELEVATION: 693.1'
DEPTH TO WATER: 12.8'

TOTAL DEPTH: 32'
WELL DIAMETER: 2" (PVC Riser & Screen)
TOC ELEVATION: 695.97' Above MSL
SCREENED INTERVAL: 26-31' (0.01" Slo
FILTER PACK INTERVAL: 24-31'
BENTONITE INTERVAL: 20-24'
GROUT INTERVAL: 1-20'

SAMPLE DATA						DESCRIPTION OF LITHOLOGY			GRAPHIC DIAGRAMS		
SAMPLE TYPE & NUMBER	SAMPLE DEPTH INTERVAL (FEET)	BLOW COUNTS	RECOVERY	PID (PPM)	OTHER SAMPLE DATA REMARKS (Munsell Color)	DEPTH (FEET)	DESCRIBE THE FOLLOWING: COLOR, GRAIN SIZE, MAJOR & MINOR CONSTITUENTS, STRUCTURES, RELATIVE DENSITY, CONSISTENCY, MOISTURE CONTENT	USCS SYMBOL	SAMPLE INTERVAL	LITHOLOGIC PROFILE	WELL CONSTRUCTION DIAGRAM
							Gray Sandy, Silty CLAY, Trace Gravel, Stiff, Moist.	CL			
S-14	26-28	0/0	1.4'		(2.5Y 5-4/2)		Grayish Brown Fine to Medium SAND, Trace Coarse Sand, Trace Gravel, Medium Dense, Saturated.	SP			
		5/5									
S-15	28-30	9/9	2.0'								
		9/6									
S-16	30-32	6/6	2.0'			30			30		
		7/5			(2.5Y 5-4/2)		Gray Sandy, Silty CLAY, Trace Sand, Trace Gravel, Stiff, Moist.	CL			
							End of Boring at 32'.				
						35			35		
						40			40		
						45			45		
						50			50		

COMMENTS:

SAMPLE INTERVAL



= Split Spoon Soil Sample

WEAVER BOOS & GORDON, INC. ENVIRONMENTAL & GEOTECHNICAL CONSULTANTS					Log of Soil Boring No.: MW-12		page 1 of 2					
					File No.: 0072-01-10		Client: Feddeler C&D Site R&M Enterprises					
Water Level Data		Location/Elevation		Boring Information								
14.0' Ft. While Drilling (BGS)		2,200,874.14 Northing Coord.		Date Started: 10/28/98		Drilling Co.: Top Flight		WBC Rep.: T. Perkins				
13.3' Ft. at Completion (BGS)		2,851,279.30 Easting Coord.		Date Comp: 10/28/98		Driller: Jeff		Drill Meth.: Hollow Stem Augers				
17.56' At Least 24 HRS. (BGS)		685.60 Elev. (MSL) (Ground)		Location: 10100 State Rd. 2 Lowell, Indiana		Helper: Matt		Sampling Meth. Split Spoon				
Depth (ft.)	Lithology	Lithology Field Description (USDA Textural Classification)	Munsell Description	Sample Interval	Sample No.	Blows/6in. (n Value)	HCL Reaction	pH	Q(p) (tsf)	Moisture	% Recovery	Notes
0		SANDY LOAM: Dry loose brown sandy loam (topsoil) with organic material (grass, roots, etc.), intermittent grayish brown clay loam from 2'-4'	10YR 4/3		1	7 7 8 7 (15)	None	7.9	0	Dry	50	
			10YR 4/3		2	13 12 11 7 (23)	Light	8.4	0	Dry	96	
-5		SANDY CLAY LOAM: Olive brown sandy clay loam, very stiff with intermittent grayish brown clay loam and dry topsoil	2.5Y 4/4		3	10 10 6 5 (16)	Light	8.2	3.5	Dry	96	
		CLAY LOAM: Brown clay loam with trace medium sand, very stiff	10YR 4/3		4	10 10 9 8 (19)	None	8.0	2.25	Moist	92	
		LOAMY SAND: Dark yellowish brown loamy sand, medium stiff poorly sorted fine sand with trace medium sand	10YR 4/6		5	4 4 4 6 (8)	None	7.8	0.5	Moist	83	
-10		SANDY CLAY LOAM: Grayish brown sandy clay loam with trace medium and fine sand, mottled with many red iron deposits, intermittent layers of loamy sand, soft to very stiff	2.5Y 5/4		6	6 2 3 8 (5)	V. Light	7.7	0.5	Moist	100	
			2.5Y 4/2		7	4 8 4 13 (12)	Moderate	8.0	3.0	Moist	92	
-15		SILTY CLAY LOAM: Yellowish brown silty clay loam with some mottling of orange, oxidized deposits	10YR 5/4						0.25			
		SANDY CLAY: Dark gray sandy clay, very stiff	2.5Y 4/1		8	6 8 11 11 (19)	Vigorous	8.1	2.5	Moist	75	
		CLAY: Dark grayish brown clay intermixed with clay loam and trace very fine sand, very stiff to hard	2.5Y 4/2		9	9 8 9 7 (17)	Moderate	8.2	3.5	Moist	75	
-20			2.5Y 4/2		10	5 6 9 11 (15)	Vigorous	8.5	4.0	Moist	67	

Client: Feddeler C&D Site
R&M Enterprises

[illegible]

MONITORING WELL COMPLETION REPORT

Site Name	Feddeler C&D Site	County	Lake	Well Number	MW-12
Site Location	Lowell, Indiana	Northing	2,200,874.14	Easting	2,851,279.36
Drilling Contractor	Top Flight			Date Drilling Started	10/28/98
Head Driller	Jeff	Helper	Matt	Date Completed	10/28/99
Drilling Method	Hollow Stem Auger			Drilling Fluids 'Type'	
Water Level at Completion	13.3' BGS			Date & Time	10/28/98 10:45 AM
Water Level after 24 hours	17.56' BGS			Date & Time	10/28/98 2:30 AM

Annular Space Details

Type of Surface Seal	Concrete
Type of Annular Sealant	Bentonite Grout
Amount of Cement: # of bags	1/8 lbs. per bag 94
Amount of Volclay: # of bags	1 lbs. per bag 50
Type of Bentonite Seal (Granular, Pellet):	Pellet (Pure Gold)
Amount of Bentonite: # of bkts	1.5 lbs. per bkt 50
Type of Sand Pack	#5 Quartz Sand
Source of Sand	Global Drilling Supplies
Amount of Sand: # of bags	4 lbs. per bag 50

Piezometer Construction Materials

	PVC	Stainless Steel	Teflon	Other (specify)
Riser Coupling Joint	x			
Riser Pipe Above W.T.	x			
Riser Pipe Below W.T.	x			
Screen	x			
Protective Casing				Flush Cover

Riser Pipe Length - feet	29.96
Protective Casing Length - feet	NA
Screen Length - feet	5.0
Total Length of Casing - feet	34.96
Screen Slot Size	#10
Diameter of borehole - inches	4.0
ID of Riser Pipe - inches	2.0

Notes:

Completed by	Tammy Perkins
Surveyed by	Weaver Boos & Gordon, Inc
File Number	0072-01-10



MSL	Ft.	
685.48	-0.18	Top of Procover
685.45	-0.15	Top of Riser
685.60	0.00	Ground Surface
684.60	-1.00	Top of Annular Sealant
659.79	-25.81	Top of Seal
NA	2.0	Seal Interval
657.79	-27.81	Top of Sand
655.79	-29.81	Top of Screen
NA	5.0	Screen Interval
650.79	-34.81	Bottom of Screen
649.60	-36.00	Bottom of Borehole

Weaver Boos & Gordon Inc.

200 S Michigan Ave.
Chicago, IL 60604
(312) 922-1030

WEAVER BOOS & GORDON, INC.
ENVIRONMENTAL & GEOTECHNICAL CONSULTANTS

Log of Soil Boring No.: **MW-13**

page 1 of 2

File No.:
0072-01-10

Client: Feddeler C&D Site
R&M Enterprises

Water Level Data		Location/Elevation	Boring Information			
15.0' Ft. While Drilling (BGS)	2,200,884.64 Northing Coord.	Date Started: 10/29/98	Drilling Co.: Top Flight		WBC Rep.: T. Perkins	
14.3' Ft. at Completion (BGS)	2,851,073.44 Easting Coord.	Date Comp: 10/29/98	Driller: Jeff		Drill Meth.: Hollow Stem Augers	
16.1' At Least 24 HRS. (BGS)	681.70 Elev. (MSL) (Ground)	Location: 10100 State Rd. 2 Lowell, Indiana	Helper: Matt		Sampling Meth. Split Spoon	

Depth (ft.)	Lithology	Lithology Field Description (USDA Textural Classification)	Munsell Description	Interval	Sample No.	Blows/6in. (n Value)	HCL Reaction	pH	Q(p) (tsf)	Moisture	% Recovery	Notes
0		SANDY LOAM: Very dark grayish brown sandy loam (topsoil) with some very coarse angular gravel, stiff	10YR 3/2		1	3 4 4 6 (8)	Moderate	7.8	1.5	Dry	75	
		SANDY LOAM: Dark yellowish brown sandy loam intermixed with olive gray clay	10YR 4/4		2	15 16 9 6 (25)	Moderate	7.9	1.5	Damp	75	
-5		SILTY CLAY: Olive brown silty clay with little fine sand and trace medium sand, hard	2.5Y 4/3		3	17 6 12 13 (18)	Light	8.1	4.5+	Damp	96	
		SANDY CLAY LOAM: Dark grayish brown sandy clay loam with some intermixed coarse sand, yellow/orange sand seams, stiff	2.5Y 4/2		4	10 12 9 12 (21)	Light	8.2	1.5	Moist	100	
		SANDY CLAY LOAM: Yellowish brown sandy clay loam with trace medium and coarse sand	10YR 5/4		5	13 14 14 16 (28)	Moderate	8.1	1.0	Moist	21	
-10		SANDY CLAY LOAM: Dark gray sandy clay loam with sand seams	2.5Y 4/1		6	15 8 6 12 (14)	Light	8.2	1.5	Wet	50	
		SAND: Dark gray fine sand with trace medium and coarse sand	2.5Y 4/1		7	6 8 6 7 (14)	Light	8.1	0	Wet	92	
		SANDY CLAY LOAM: Dark gray sandy clay loam, very stiff	2.5Y 4/1		8	6 6 12 9 (18)	Moderate	8.1	2.5	Moist	92	
-15		SILTY SAND: Dark gray silty sand with some mafic material and trace feldspar	2.5Y 4/1		9	10 12 6 11 (18)	Light	7.9	0	Wet	58	
		SILTY SAND: Olive brown silty sand with some medium and coarse sand, some very coarse gravel, intermittent seams of silty clay loam	2.5Y 4/3		10	7 9 13 12 (22)	V. Light	7.8	0	Wet	88	
		SAND: Dark grayish brown sand with some medium and trace coarse sand, trace mafic and feldspar, silty clay loam seams	2.5Y 4/2				Moderate	7.7	0	Wet	100	

WEAVER BOOS & GORTON, INC.
ENVIRONMENTAL & GEOTECHNICAL CONSULTANTS

Log of Soil Boring No.: **MW-13** page 2 of 2

File No.:
0072-01-10

Client: Feddeler C&D Site
R&M Enterprises

Water Level Data		Location/Elevation		Boring Information									
15.0'	Ft. While Drilling (BGS)	2,200,884.69	Northing Coord.	Date Started: 10/29/98		Drilling Co.: Top Flight		WBC Rep.: T. Perkins					
14.3'	Ft. at Completion (BGS)	2,851,073.44	Easting Coord.	Date Comp: 10/29/98		Driller: Jeff		Drill Meth.: Hollow Stem Augers					
16.1'	At Least 24 HRS. (BGS)	681.70	Elev. (MSL) (Ground)	Location: 10100 State Rd. 2 Lowell, Indiana		Helper: Malt		Sampling Meth. Split Spoon					
Depth (ft.)	Lithology	Lithology Field Description (USDA Textural Classification)		Munsell Description	Samp. Interval	Sample No.	Blows/6in. (n Value)	HCL Reaction	pH	Q(p) (tsf)	Moisture	% Recovery	Notes
20		SANDY CLAY LOAM: Sandy clay loam with seams of stiff clay, very stiff		2.5Y 4.2		11	8 7 7 13 (14)	Light	7.7	2.0	Wet	100	
Note: <input checked="" type="checkbox"/> Boring terminated at 22' BGS. <input checked="" type="checkbox"/> Groundwater elevation while drilling <input checked="" type="checkbox"/> Groundwater elevation at completion of boring <input checked="" type="checkbox"/> Groundwater elevation at least 24 hours after completion													

MONITORING WELL COMPLETION REPORT

Site Name	Peddeler C&D Site	County	Lake	Well Number	MW-13
Site Location	Lowell, Indiana	Northing	2,200,884.68	Easting	2,851,073.44
Drilling Contractor	Top Flight			Date Drilling Started	10/29/98
Head Driller	Jeff	Helper	Matt	Date Completed	10/29/98
Drilling Method	Hollow Stem Auger			Drilling Fluids Type	
Water Level at Completion	14.3' BGS			Date & Time	10/29/98 8:00 AM
Water Level after 24 hours	16.1' BGS			Date & Time	10/29/98 11:30 AM

Annular Space Details

Type of Surface Seal	Concrete
Type of Annular Sealant	Bentonite Grout
Amount of Cement: # of bags	1/8 lbs. per bag 94
Amount of Volclay: # of bags	1 lbs. per bag 50
Type of Bentonite Seal (Granular, Pellet):	Pellet (Pure Gold)
Amount of Bentonite: # of bkt	1.5 lbs. per bkt 50
Type of Sand Pack	#5 Quartz Sand
Source of Sand	Global Drilling Supplies
Amount of Sand: # of bags	4 lbs. per bag 50

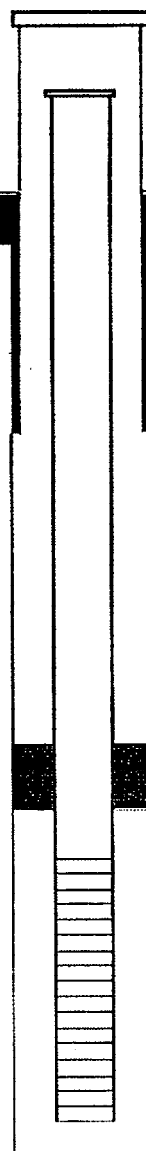
Piezometer Construction Materials

	PVC	Stainless Steel	Teflon	Other (specify)
Riser Coupling Joint	x			
Riser Pipe Above W.T.	x			
Riser Pipe Below W.T.	x			
Screen	x			
Protective Casing				Flush Cover

Riser Pipe Length - feet	15.62
Protective Casing Length - feet	NA
Screen Length - feet	5.0
Total Length of Casing - feet	20.62
Screen Slot Size	#10
Diameter of borehole - inches	4.0
ID of Riser Pipe - inches	2.0

Notes:

Completed by	Tammy Perkins
Surveyed by	Weaver Boos & Gordon, Inc
File Number	0072-01-10



MSL	Ft.	
681.70	0.00	Top of Procover
681.38	-0.32	Top of Riser
681.70	0.00	Ground Surface
681.20	-0.50	Top of Annular Sealant
670.40	-11.30	Top of Seal
NA	2.0	Seal Interval
668.40	-13.30	Top of Sand
666.40	-15.30	Top of Screen
NA	5.0	Screen Interval
661.40	-20.30	Bottom of Screen
659.70	-22.00	Bottom of Borehole

Weaver Boos & Gordon Inc.

200 S Michigan Ave.
Chicago, IL 60604
(312) 922-1030

SMITH, JANET

From: Clifford E. Duggan, Jr. [cduggan@lcswmd.com]
Sent: Wednesday, October 18, 2006 11:58 AM
To: PALIN, BRUCE
Subject: Fw: Feddeler LF #2 e-mail

Attachments: Sampling Location at Feddeler LF on aerial photos.pdf; Temp Well Logs at Feddeler LF.pdf;
File Documentation of Haz Waste at Feddeler LF.pdf



Sampling Location at Feddeler ... Temp Well Logs at Feddeler LF.... File Documentation of Haz Wast...

----- Original Message -----

From: "Clifford E. Duggan, Jr." <cduggan@lcswmd.com>
To: <purdeydog@aol.com>
Sent: Tuesday, October 17, 2006 7:01 PM
Subject: Fw: Feddeler LF

>

> ----- Original Message -----

> From: "Mark Broses" <mbroses@sehinc.com>
> To: <srhenshaw@aol.com>
> Cc: <jlangbehn@lcswmd.com>; <jromano@lcswmd.com>; <cduggan@lcswmd.com>
> Sent: Thursday, September 28, 2006 3:18 PM
> Subject: Feddeler LF

>

>

>> Steve - attached are the new well logs, sampling locations, and a couple
>> historical documents from the IDEM file (which you may have already).

>>

>> Please call me with any questions or comments.

>>

>> Thanks. Mark

>>

>>

>> (See attached file: Sampling Location at Feddeler LF on aerial
>> photos.pdf)

>> (See attached file: Temp Well Logs at Feddeler LF.pdf) (See attached file:
>> File Documentation of Haz Waste at Feddeler LF.pdf)

>>

>>

>>

>> Mark J. Broses, PE | Principal
>> Senior Environmental Engineer
>> SEH

>> 421 Frenette Drive, Chippewa Falls, WI 54729

>> 715.720.6236 (direct / voicemail)

>> 715.271.7501 (mobile phone)

>> 800.472.5881 (toll free office)

>> 715.720.6300 (office fax)

>> mbroses@sehinc.com (e-mail)

>> www.sehinc.com (website)

>

Refer

To

PHOTO

B

Refer

To

PHOTO

C



RECORD OF WATER WELL State Form 35680 (R5 / 9-04)

Driller--Mail complete record in 30 days to:
INDIANA DEPT. OF NATURAL RESOURCES
Division of Water
402 W. Washington St., Rm. W264
Indianapolis, IN 46204-2641
(877) 928-3755 toll-free or (317) 232-4160

County Permit
Number
DNR Variance
Number

Include if applicable

Fill in completely

MW--A

WELL LOCATION									
County where drilled Lake		Civil township name West Creek		Township number (N-S) 33 N		Range number (E-W) 10 W		Section 21	
Driving directions to the well location (include trip origin, street & road names, intersecting roads, and compass directions). Show well address below and subdivision in box at lower right. There is space for a map on the reverse side. From Cedar Creek in Lowell, IN, head west on W. 181st Ave approximately 2 miles. Cross Bruce Ditch and take First Right @ 10100 W. 181st Ave. continue on gravel North for 600 Feet to well.						UTM Northing 4586042			
						UTM Easting 455643			
						Datum <input type="checkbox"/> NAD 27 <input checked="" type="checkbox"/> NAD 83			
						GPS used Lowrance iFINDER Pro			
Well address:						Subdivision name & lot number (if applicable)			
If drilled for water supply, this well is: <input type="checkbox"/> First well on property <input type="checkbox"/> Replacement well <input type="checkbox"/> Additional well on property <input type="checkbox"/> Dry hole									
OWNER - CONTRACTOR									
Well owner--name Lake County Solid Waste Management District						Telephone number 219.769.3820			
Address (number and street, city, state, ZIP code) 7820 Broadway, Merrillville, IN 46410									
Building contractor--name				Address (number and street, city, state, ZIP code)				Telephone number	
Drilling contractor--name SCS Environmental Contracting				Address (number and street, city, state, ZIP code) P.O. Box 8980, Fort Wayne, Indiana 46898				Telephone number 260.497.9006	
Equipment operator--name Andy Hermes				License number of operator 2094		Date of well completion 9/06/2006			
CONSTRUCTION DETAILS					WELL LOG				
Use of well <input type="checkbox"/> Home <input type="checkbox"/> Public supply <input type="checkbox"/> Industrial / commercial <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input checked="" type="checkbox"/> Monitoring / environ. <input type="checkbox"/> Test hole Other:		Drilling method <input type="checkbox"/> Rotary <input type="checkbox"/> Reverse rotary <input type="checkbox"/> Cable tool <input type="checkbox"/> Jet <input type="checkbox"/> Bucket / bore <input checked="" type="checkbox"/> Auger (including HSA) <input type="checkbox"/> Direct push Other:		Type of pump <input type="checkbox"/> Submersible <input type="checkbox"/> Shallow-well jet <input type="checkbox"/> Deep-well jet <input checked="" type="checkbox"/> No pump installed Other:		FORMATIONS: Type of material		From (feet)	To (feet)
Total depth of well (feet)		Borehole diameter (in.) 8.2		Gravel pack inserted <input type="checkbox"/> Yes <input type="checkbox"/> No		Dark Brown to Black Topsoil		0	1
Casing length (feet)		Casing diameter (in.) (inside) 2.0		Casing material <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Steel		FILL: Brown to Black Lean Clay Mixed with Sand,			
Screen length (feet)		Screen diameter (in.) (inside) 2.0		Screen material <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Steel		Some Refuse (pieces of fabric, some pieces of metal)		1	18
Screen slot size 0.010		Water quality (clear, odor, etc.) Slightly Turbid		Pump depth setting (feet) NA					
WELL CAPACITY TEST									
Test method <input type="checkbox"/> Air <input type="checkbox"/> Bailing <input type="checkbox"/> Pumping		Static level below surface feet		Gallons per min.		Hours tested		Drawdown (change in level) feet	
						Brown Lean CLAY, Little Sand		18	45
GROUTING			WELL ABANDONMENT						
Grout material Chipped Bentonite		Grout depth from to 1 to 15 ft		Sealing material		Depth filled from to			
Installation method Gravity		No. of bags used		Installation method		No. of bags used			
Additional space for well log and comments on reverse side									
I hereby swear or affirm, under the penalties for perjury, that the information submitted herewith is, to the best of my knowledge and belief, true, accurate, and complete.				Signature of drilling contractor or authorized representative John E. Shiff				MUST BE SIGNED OR STAMPED Indiana CPL #1643	
								Date 9-19-06	

SITE CONFIRMATION - FOR ADMINISTRATIVE USE ONLY

-Well/driller does not fill out this section-

County	Township	Range	Section	
USGS topo map	Ground elevation	1/4 of	1/4 of	1/4 of
Field location	Depth to bedrock	Reserve of grant name	Reserve No.	
By	FLW of EL	Subdivision name	Lot number	
Date	FLN of SL	UTM coordinates on NAD 27 accepted, verified, or determined by Division of Water	UTM Northing	
IRREGULAR LAND SURVEY other than 2nd Principal Meridian	FLW of WL	UTM Easting		
<input type="radio"/> GT Greenville Treaty area (1st Prin. Merid.) <input type="radio"/> MD Vincennes donations and grants <input type="radio"/> CMG Clark Military Grant (sections 1-298) <input type="radio"/> MRL Michigan Road Land (sections 1-45) <input type="radio"/> Reserve granted by treaty (name above)	Bedrock elevation	Aguler elevation		

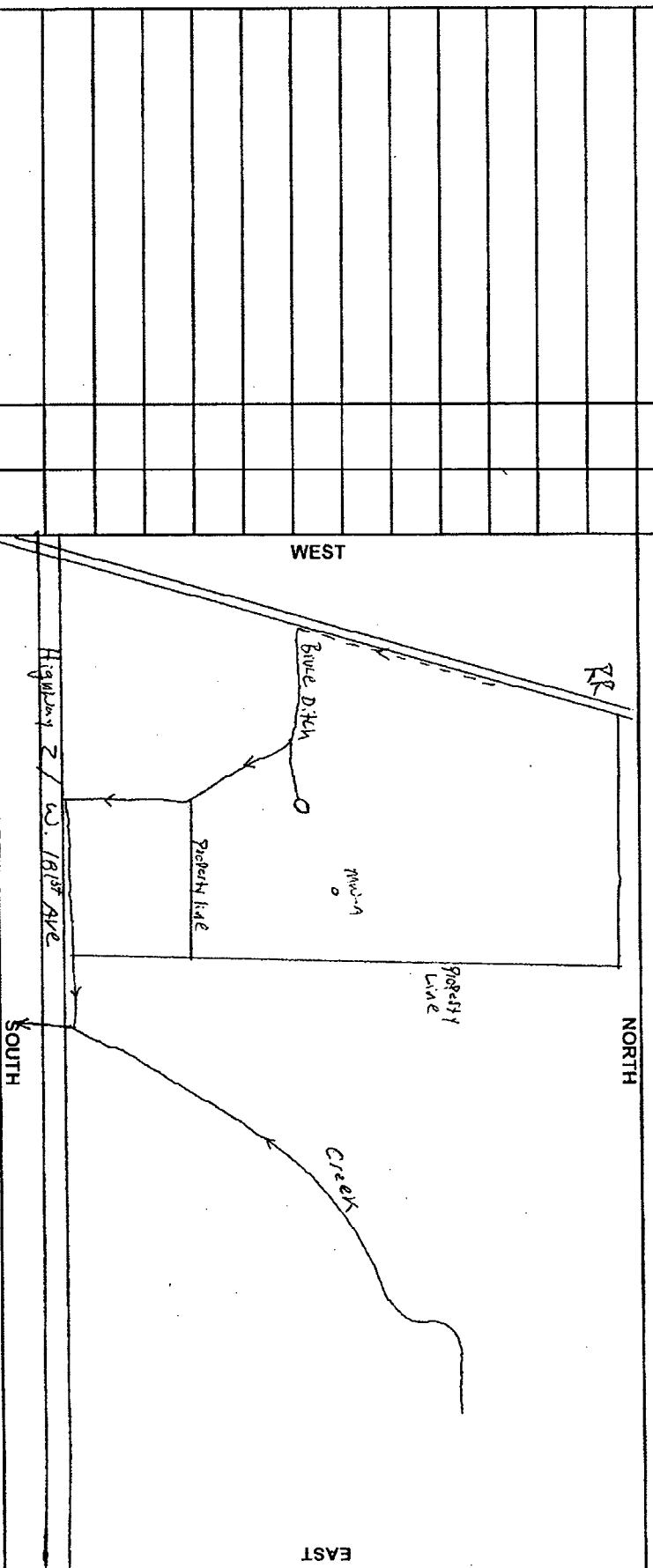
WELL LOG (continued from front)

COMMENTS

Boring MW-A was blind-drilled to 45 ft below ground surface using hollow-stem augers. Lithologic descriptions are based on auger cuttings and changes in drilling rate, and should be considered approximate.

MAP INSERT OR SKETCH SHOWING LOCATION

Locate with reference to highways, intersecting streets and county roads, and distinctive landmarks.



T-3M W1

**RECORD OF WATER WELL**

State Form 35680 (R5 / 9-04)

Driller--Mail complete record in 30 days to:
INDIANA DEPT. OF NATURAL RESOURCES
Division of Water
402 W. Washington St., Rm. W264
Indianapolis, IN 46204-2641
(877) 928-3755 toll-free or (317) 232-4160

County Permit
Number
DNR Variance
Number

Include if applicable

Fill in completely

MLW-B

WELL LOCATION						
County where drilled Lake	Civil township name West Creek	Township number (N-S) 33 N	Range number (E-W) 10 W	Section 21		
Driving directions to the well location (include trip origin, street & road names, intersecting roads, and compass directions). Show well address below and subdivision in box at lower right. There is space for a map on the reverse side. From Cedar Creek in Lowell, IN, head west on W. 181st Ave approximately 2 miles. Cross Bruce Ditch and take First Right @ 10100 W. 181st Ave. continue on gravel North for 600 Feet to well. Well address:			UTM Northing 4506328			
			UTM Easting 454322			
			Datum <input type="checkbox"/> NAD 27 <input checked="" type="checkbox"/> NAD 83			
			GPS used Lowrance I Fider Pro			
Subdivision name & lot number (if applicable)						
If drilled for water supply, this well is: <input type="checkbox"/> First well on property <input type="checkbox"/> Replacement well <input type="checkbox"/> Additional well on property <input type="checkbox"/> Dry hole						
OWNER - CONTRACTOR						
Well owner--name Lake County Solid Waste Management District			Telephone number 219.769.3820			
Address (number and street, city, state, ZIP code) 7820 Broadway, Merrillville, IN 46410						
Building contractor--name		Address (number and street, city, state, ZIP code)		Telephone number		
Drilling contractor--name SCS Environmental Contracting		Address (number and street, city, state, ZIP code) P.O. Box 8980 Fort Wayne, Indiana 46898		Telephone number 260.497.9006		
Equipment operator--name Andy Hermes		License number of operator 2094		Date of well completion 9/06/2006		
CONSTRUCTION DETAILS			WELL LOG			
Use of well <input type="checkbox"/> Home <input type="checkbox"/> Public supply <input type="checkbox"/> Industrial / commercial <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input checked="" type="checkbox"/> Monitoring / environ. <input type="checkbox"/> Test hole Other:	Drilling method <input type="checkbox"/> Rotary <input type="checkbox"/> Reverse rotary <input type="checkbox"/> Cable tool <input type="checkbox"/> Jet <input type="checkbox"/> Bucket / bore <input checked="" type="checkbox"/> Auger (including HSA) <input type="checkbox"/> Direct push Other:	Type of pump <input type="checkbox"/> Submersible <input type="checkbox"/> Shallow-well jet <input type="checkbox"/> Deep-well jet <input checked="" type="checkbox"/> No pump installed Other:	FORMATIONS: Type of material		From (feet)	To (feet)
			Dark Brown to Black Topsoil		0	1
Total depth of well (feet)			Pump depth setting (feet) NA			
Casing length (feet)			Casing material <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Steel			
Screen length (feet)			Screen material <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Steel			
Screen slot size 0.010			Water quality (clear, odor, etc.) Slightly Turbid			
WELL CAPACITY TEST						
Test method <input type="checkbox"/> Air <input type="checkbox"/> Bailing <input type="checkbox"/> Pumping	Static level below surface feet	Gallons per min.	Hours tested	Drawdown (change in level) feet		
GROUTING			WELL ABANDONMENT			
Grout material Chipped Bentonite	Grout depth from 1 to 8	Sealing material	Depth filled from to			
Installation method Gravity	No. of bags used	Installation method	No. of bags used			
Additional space for well log and comments on reverse side						
I hereby swear or affirm, under the penalties for perjury, that the information submitted herewith is, to the best of my knowledge and belief, true, accurate, and complete.			Signature of drilling contractor or authorized representative John E. Giff Indiana CPA #1643			Date 9-19-06

MU-B

SITE CONFIRMATION - FOR ADMINISTRATIVE USE ONLY

Well driller does not fill out this section.

County	Township	Range	1/4 of 1/4 of 1/4		Section
USGS topo map	FLW of EL	Ground elevation	Reserve or grant name		Reserve No.
Field location	FLN of SL	Depth to bedrock	Subdivision name		Lot number
By	Date	FLN of SL	Bedrock elevation	UTM coordinates on NAD 27 accepted, verified, or determined by Division of Water	
IRREGULAR LAND SURVEY other than 2nd Principal Meridian	<input type="radio"/> GI Greenville Treaty area (1st Prin. Merid.) <input type="radio"/> MD Vincennes donations and grants <input type="radio"/> CMG Clark Military Grant (sections 1-298) <input type="radio"/> MRL Michigan Road Land (sections 1-45) <input type="radio"/> Reserve granted by treaty (name above)	FLN of SL	Bedrock elevation	UTM Northing	UTM Easting

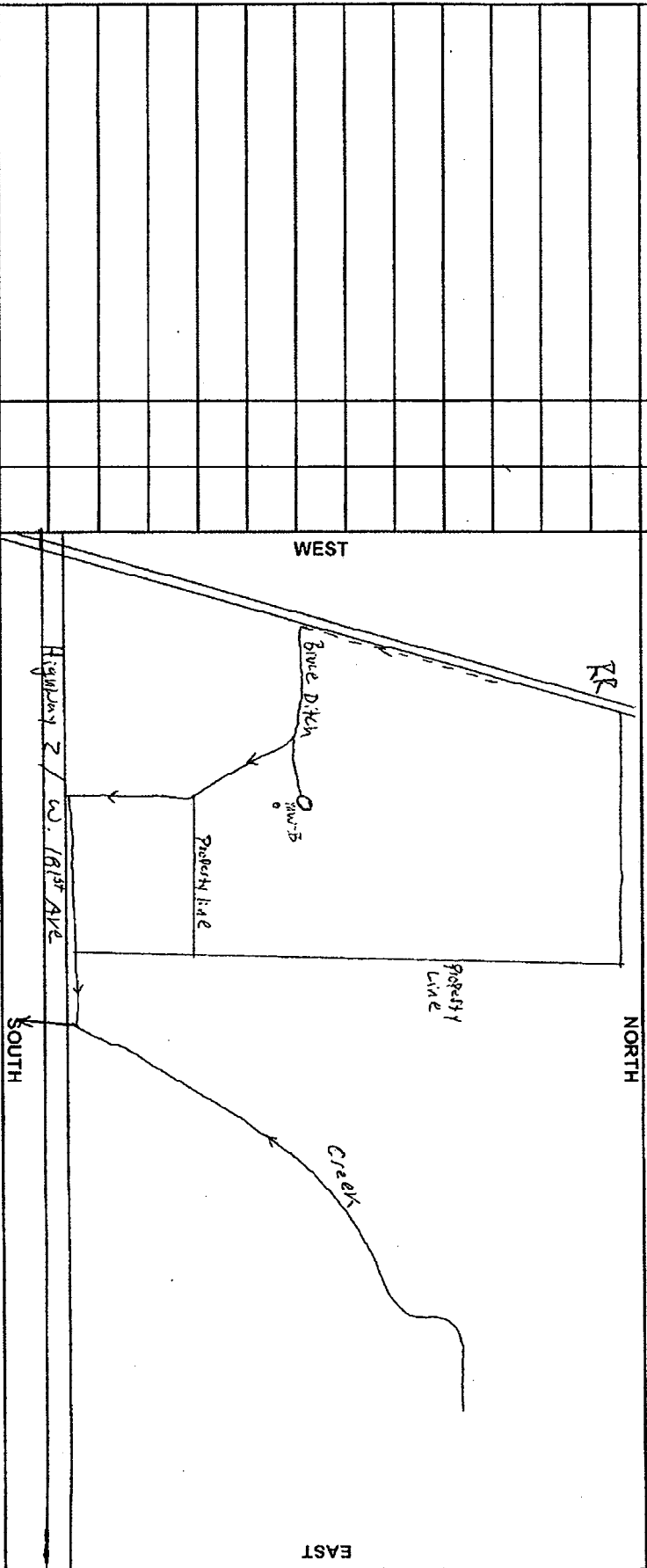
WELL LOG (continued from front)

COMMENTS

Well MU-B is nested with RE-B and was Blind-drilled using Hollow-Stem Augers. Lithologic Descriptions are Based on Auger cuttings and changes in Drilling Rate, and Should be Considered Approximate

MAP INSERT OR SKETCH SHOWING LOCATION

Locate with reference to highways, intersecting streets and county roads, and distinctive landmarks.





RECORD OF WATER WELL

State Form 35680 (R5 / 9-04)

Driller--Mail complete record in 30 days to:
INDIANA DEPT. OF NATURAL RESOURCES
Division of Water
402 W. Washington St., Rm. W264
Indianapolis, IN 46204-2641
(877) 928-3755 toll-free or (317) 232-4160

County Permit
Number
DNR Variance
Number

Include if applicable

Fill in completely PZ-B

WELL LOCATION					
County where drilled Lake	Civil township name West Creek	Township number (N-S) 33 N	Range number (E-W) 10 W	Section 21	
Driving directions to the well location (include trip origin, street & road names, intersecting roads, and compass directions). Show well address below and subdivision in box at lower right. There is space for a map on the reverse side. From Cedar Creek in Lowell, IN, head west on W. 181st Ave approximately 2 miles. Cross Bruce Ditch and take First Right @ 10100 W. 181st Ave. continue on gravel North for 600 Feet to well. Well address:			UTM Northing 4586328		
			UTM Easting 454299		
			Datum <input type="checkbox"/> NAD 27 <input checked="" type="checkbox"/> NAD 83		
			GPS used Lowmire I Fader Pro		
			Subdivision name & lot number (if applicable)		
If drilled for water supply, this well is: <input type="checkbox"/> First well on property <input type="checkbox"/> Replacement well <input type="checkbox"/> Additional well on property <input type="checkbox"/> Dry hole					
OWNER-CONTRACTOR					
Well owner--name Lake County Solid Waste Management District			Telephone number 219.769.3820		
Address (number and street, city, state, ZIP code) 7820 Broadway, Merrillville, IN 46410					
Building contractor--name		Address (number and street, city, state, ZIP code)		Telephone number	
Drilling contractor--name SCS Environmental Contracting		Address (number and street, city, state, ZIP code) P.O. Box 8980 Fort Wayne Indiana		Telephone number 46898 266.497.9006	
Equipment operator--name Andy Hermes		License number of operator 2094		Date of well completion 9/06/2006	
CONSTRUCTION DETAILS			WELL LOG		
Use of well <input type="checkbox"/> Home <input type="checkbox"/> Public supply <input type="checkbox"/> Industrial / commercial <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input checked="" type="checkbox"/> Monitoring / environ. <input type="checkbox"/> Test hole Other:	Drilling method <input type="checkbox"/> Rotary <input type="checkbox"/> Reverse rotary <input type="checkbox"/> Cable tool <input type="checkbox"/> Jet <input type="checkbox"/> Bucket / bore <input checked="" type="checkbox"/> Auger (including HSA) <input type="checkbox"/> Direct push Other:	Type of pump <input type="checkbox"/> Submersible <input type="checkbox"/> Shallow-well jet <input type="checkbox"/> Deep-well jet <input checked="" type="checkbox"/> No pump installed Other:	FORMATIONS: Type of material Dark Brown to Black Topsoil Fill: Black Lean Clay, Some Sand, Some Refuse (Wood and Small Pieces of Debris)		
Total depth of well (feet)	Borehole diameter (in.) 8.2	Gravel pack inserted <input type="checkbox"/> Yes <input type="checkbox"/> No	From (feet)	To (feet)	
Casing length (feet)	Casing diameter (in.) 2.0 (inside)	Casing material <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Steel	1	13	
Screen length (feet)	Screen diameter (in.) 2.0 (inside)	Screen material <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Steel			
Screen slot size 0.010	Water quality (clear, odor, etc.) Slightly Turbid	Pump depth setting (feet) NA			
WELL CAPACITY TEST					
Test method <input type="checkbox"/> Air <input type="checkbox"/> Bailing <input type="checkbox"/> Pumping	Static level below surface feet	Gallons per min.	Hours tested	Drawdown (change in level) feet	
				Brown Fine Clayey SAND	13 40.5
				Some Silt, Trace	
				Gravel, Becomes	
				somewhat sandier with	
				depth	
GROUTING		WELL ABANDONMENT		Additional space for well log and comments on reverse side	
Grout material Chipped Bentonite	Grout depth from to 1 32ft	Sealing material	Depth filled from to		
Installation method Gravity	No. of bags used	Installation method	No. of bags used		
I hereby swear or affirm, under the penalties for perjury, that the information submitted herewith is, to the best of my knowledge and belief, true, accurate, and complete.			Signature of drilling contractor or authorized representative John P. Huff		MUST BE SIGNED OR STAMPED Indiana CPQ # 1643 Date 9-19-06

P-2-B

SITE CONFIRMATION FOR ADMINISTRATIVE USE ONLY

—Well driller does not fill out this section.

—Well driller does not fill out this section—										
County		Township		Range		Section				
USGS topo map				Ground elevation		1/4 of		1/4 of	1/4	Reserve No.
Field location				Depth to bedrock		Subdivision name				Lot number
By		Date		Ft N of SL		UTM coordinates on NAD 27 accepted, verified, or determined by Division of Water		UTM Northng		UTM Eastng
IRREGULAR LAND SURVEY other than 2nd Principal Meridian		<input type="checkbox"/> GT Greenville Treaty area (1st Prin. Merid.) <input type="checkbox"/> MD Vincennes donations and grants <input type="checkbox"/> CMG Clark Military Grant (sections 1-298) <input type="checkbox"/> MRL Michigan Road Land (sections 1-45) <input type="checkbox"/> Reserve granted by treaty (name above)		Ft E of WL		Bedrock elevation		Ft S of NL		Acquifer elevation

WELL LOG (continued from front)

COMMENTS

[illegible]



RECORD OF WATER WELL

State Form 35680 (R5 / 9-04)

Driller--Mail complete record in 30 days to:
INDIANA DEPT. OF NATURAL RESOURCES
Division of Water
402 W. Washington St., Rm. W264
Indianapolis, IN 46204-2641
(877) 928-3755 toll-free or (317) 232-4160

County Permit
Number
DNR Variance
Number

Include if applicable

Fill in completely

Misc

WELL LOCATION					
County where drilled LAKE	Civil township name West Creek	Township number (N-S) 33 N	Range number (E-W) 10 W	Section 21	
Driving directions to the well location (Include trip origin, street & road names, intersecting roads, and compass directions). Show well address below and subdivision in box at lower right. There is space for a map on the reverse side. From Cedar Creek in Lowell, IN, head west on W. 181st Ave. Approximately 2 miles. Cross Bruce Ditch and take First Right @ 10100 W. 181st Ave. continue on gravel North for 600 Feet to well. Well address:			UTM Northing 4586941		
			UTM Easting 454906		
			Datum <input type="checkbox"/> NAD 27 <input checked="" type="checkbox"/> NAD 83		
			GPS used Lowville I Field Pro		
Subdivision name & lot number (if applicable)					
If drilled for water supply, this well is: <input type="checkbox"/> First well on property <input type="checkbox"/> Replacement well <input type="checkbox"/> Additional well on property <input type="checkbox"/> Dry hole					
OWNER - CONTRACTOR					
Well owner--name Lake County Solid Waste Management District				Telephone number 219.769.3820	
Address (number and street, city, state, ZIP code) 7820 Broadway, Merrillville, IN 46410					
Building contractor--name		Address (number and street, city, state, ZIP code)		Telephone number	
Drilling contractor--name SCS Environmental Contracting		Address (number and street, city, state, ZIP code) P.O. Box 8980 Fort Wayne Indiana		Telephone number 46898 260.497.9006	
Equipment operator--name Andy Hermes		License number of operator 2094		Date of well completion 9/06/2006	
CONSTRUCTION DETAILS			WELL LOG		
Use of well <input type="checkbox"/> Home <input type="checkbox"/> Public supply <input type="checkbox"/> Industrial / commercial <input type="checkbox"/> Livestock <input type="checkbox"/> Irrigation <input checked="" type="checkbox"/> Monitoring / environ. <input type="checkbox"/> Test hole Other:	Drilling method <input type="checkbox"/> Rotary <input type="checkbox"/> Reverse rotary <input type="checkbox"/> Cable tool <input type="checkbox"/> Jet <input type="checkbox"/> Bucket / bore <input checked="" type="checkbox"/> Auger (including HSA) <input type="checkbox"/> Direct push Other:	Type of pump <input type="checkbox"/> Submersible <input type="checkbox"/> Shallow-well jet <input type="checkbox"/> Deep-well jet <input checked="" type="checkbox"/> No pump installed Other:	FORMATIONS: Type of material FILL: Brown Lean CLAY, Some Gravel and Sand FILL: Black Organic Refuse (Appears to be Partially Decomposed mulch), Obstruction (Possible Concrete Piece) @ 6 ft Probable Natural Sails, No Cuttings Recovered	From (feet) 0 3 3 15 15 17	To (feet) 3 15 17
Total depth of well (feet) 17 Casing length (feet) 7 Screen length (feet) 10 Screen slot size 0.010	Borehole diameter (in.) 8.2 Casing diameter (in.) 2.0 (inside) Screen diameter (in.) 2.0 (inside) Water quality Slightly Turbid, Slightly Fuzzy	Gravel pack inserted <input type="checkbox"/> Yes <input type="checkbox"/> No Casing material <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Steel Screen material <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Steel Pump depth setting (feet) NA			
WELL CAPACITY TEST					
Test method <input type="checkbox"/> Air <input type="checkbox"/> Bailing <input type="checkbox"/> Pumping	Static level below surface feet	Gallons per min.	Hours tested	Drawdown (change in level) feet	
GROUTING		WELL ABANDONMENT			
Grout material Chipped Bentonite	Grout depth from to 1 5	Sealing material	Depth filled from to		
Installation method Gravity	No. of bags used	Installation method	No. of bags used		
Additional space for well log and comments on reverse side					
I hereby swear or affirm, under the penalties for perjury, that the information submitted herewith is, to the best of my knowledge and belief, true, accurate, and complete.		Signature of drilling contractor or authorized representative John E. Huff			Date 9-19-06

Additional space for well log and comments on reverse side

I hereby swear or affirm, under the penalties for perjury, that the information submitted herewith is, to the best of my knowledge and belief, true, accurate, and complete.

Signature of drilling contractor or authorized representative MUST BE SIGNED OR STAMPED

Date

John E. Huff

Indiana CPG #1643

9-19-06

SITE CONFIRMATION—FOR ADMINISTRATIVE USE ONLY

SITE CONFIRMATION—FOR ADMINISTRATIVE USE ONLY									
—Well driller does not fill out this section—									
County		Township		Range		Section			
USGS topo map								1/4 of	1/4 of
								Reserve or grant name	Reserve No.
Field location								Subdivision name	Lot number
By		Date						UTM coordinates on NAD 27 accepted, verified, or determined by Division of Water	UTM Northing
IRREGULAR LAND SURVEY		<input type="radio"/> GT Greenville Treaty area (1st Prin. Merid.) <input type="radio"/> MD Vincennes donations and grants <input type="radio"/> CMG Clark Military Grant (sections 1-298) <input type="radio"/> MRL Michigan Road Land (sections 1-45) <input type="radio"/> Reserve granted by treaty (name above)							UTM Easting
other than 2nd Principal Meridian									

[illegible]

Jeff Langbehn

From: "BRUCE PALIN" <bpalin@dem.state.in.us>
To: <jlangbehn@lcswwmd.com>
Sent: Thursday, August 14, 2003 10:47 PM
Subject: Feddeler Landfill

I had staff research the files and we do not have any samples taken of the leachate at the Feddeler Landfill. Staff did find information on different types of waste disposed in the site over its lifetime. Their summary indicated documentaion of the following:

hazardous waste from Spartan Chemicals (500 barrels), fatty acid 200, acrylonitrile, liquid and sludge waste, pesticides, paint thinner, white goods, refuse, phenolic resins, hexamine, flulutex polymer, bag house dust. In addition, as you probably remember that site was approved for Globe Industry waste that contained insulation material, textile by-products, latex, borax, polyethylene film, phenolic resins, asphalt, limestone padding, amorphous polypropylene, kraft, polyethylene, semi-cured phenolic padding, PVC liner, asphalt barriers.

Given the variety of materials staff suggested that the leachate is likely similar to what might be found in a conventional landfill. If you need additional informatio please let me know.

8/21/2003

Division of Sanitary Engineering
Indiana State Board of Health

SOLID WASTE DISPOSAL FACILITY INSPECTION REPORT

DATE: 8/8/75 TIME: _____ COUNTY: LAKE
 SUBJECT: FEDDELER DUMP
 LOCATION: ON S.R. 2, 3/4 MI. E OF U.S. 41
 PERSON(S) CONTACTED: ED FEDDELER, MARY (MRS. ROBERT) FEDDELER

I. IS THIS OPERATION APPROVED?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	PERMIT NUMBER	Vectors
II. TYPE OF OPERATION <u>(DUMP)</u>	LANDFILL	OTHER	() 19. Effective vector control program.
III. OPERATING DEFICIENCIES			Safety
General Standards			() 20. Roll bars and fire extinguishers on rolling equipment.
() 1. On-site roads passable by vehicles regardless of weather.			() 21. Provisions available to extinguish fires.
() 2. Sanitary facilities meet standards.			() 22. Communication equipment available.
() 3. Livestock feeding prohibited.			() 23. Scavenging prohibited.
() 4. Proximity to dwellings greater than 600 feet.			() 24. Traffic patterns established, vehicles discharge without delay.
Water Quality			Operator Instructions
() 5. Groundwater monitoring wells installed in accordance with Board requirements. Sampling as specified.			() 25. Operating manual, safety precautions, and procedures available.
() 6. Surface drainage controlled.			Cover Applications
() 7. No refuse deposited in water.			() 26. Waste spread in layers, compacted on approximate 3:1 slope.
() 8. Leachate control/treatment satisfactory.			() 27. Daily cover adequate.
Air Quality			() 28. Finished portions covered with minimum of two feet of earth, seeded with suitable vegetation.
() 9. Open burning () past () present			() 29. Final slope not less than 2%, without ponding of water.
Aesthetics			Hazardous and Special Wastes
() 10. Control and/or policing of blowing paper adequate.			() 30. No unauthorized hazardous wastes accepted.
() 11. Vehicular access controlled when site is not open.			() 31. Bulky waste handling adequate.
() 12. Containers at gate clean and litter free.			() 32. Dead animal handling adequate.
() 13. Natural windbreaks and greenbelts maintained.			Equipment
() 14. Entrance sign adequate, permit numbers and working hours stated.			() 33. Refuse handling equipment adequate to spread, compact and cover waste.
() 15. Salvaged materials properly stored, and not causing operational problems.			Records
() 16. On-site roads constructed to minimize tracking of mud onto public roads.			() 34. Set of approved plans on site.
() 17. Refuse processing facilities maintained in litter free condition. Overnight storage areas enclosed.			
Gases			
() 18. Decomposition gases adequately controlled.			

IV. PHYSICAL CHARACTERISTICS OF SITE:

Proximity to major highways: _____
 Proximity to dwellings: _____
 Water on site or nearby: _____
 Jurisdiction of site or operation: Private County Municipal

V. REMARKS FROM PART III.

Item Remarks

Two types of disposal operation are being conducted:
 (1) solid fill disposal (with accompanying salvage)
 (2) liquid + sludge waste disposal
 Soils on the site appear to be light clay to at least 6' bottom of H.W. stage. Numerous barrels being deposited in 2 trenches, 1 of which was being covered as arrived at site.

VI. OVERALL EVALUATION:

Overall evaluation of operation: Excellent Good Marginal Unacceptable

Overall evaluation of site: Good Marginal Poor

Operation began in 1971 or '72.

VII. Comments/Diagrams

Home Sanitation, Independent Wastes,
 Globe Industries, and Feddelers' haul
 solid fill type wastes into site.

Inspected by: Brian P. Opel

Hazardous wastes are hauled in from a company in Michigan.
 Printing, labels on barrels: (1) TAG Chemicals Co. (2)
 (3) Franklin; 34-40 S. Park St., Bedford Ohio; batch no 12/26
 (4) Hercules; Pamolyn Fatty Acid 200 (4) acrylonitrile (Shordeman Chem. Co., Easting Grand Rapids, Mich.)

SMITH, JANET

From: Clifford E. Duggan, Jr. [cduggan@lcswwmd.com]
Sent: Wednesday, October 18, 2006 12:01 PM
To: PALIN, BRUCE
Subject: Fw: revised letter to LCSWMD #3 e-mail

Attachments: Analytical results.xls; DRAFT FED LF Prelim Investigation Letter Report.doc



Analytical results.xls (109 KB.. Prelim Investiga...

----- Original Message -----

From: "Clifford E. Duggan, Jr." <cduggan@lcswwmd.com>
To: <purdeydog@aol.com>
Sent: Tuesday, October 17, 2006 7:03 PM
Subject: Fw: revised letter to LCSWMD

>
> ----- Original Message -----
> From: "Mark Brose" <mbrose@sehinc.com>
> To: "Clifford E. Duggan, Jr." <cduggan@lcswwmd.com>; <jromano@lcswwmd.com>
> Cc: "Kerry Keith" <kkeith@sehinc.com>
> Sent: Wednesday, September 20, 2006 6:06 AM
> Subject: Fw: revised letter to LCSWMD

>> Cliff and Jeanette -

>>
>> attached are summaries of the results and a draft investigation report.
>> As you will see in the text of the report, we still need to add existing
>> background sections from the workplan letter, as well as beef up the
>> discussion. However, the draft text provided should provide you
>> sufficient information to come up to speed on the activities and latest
>> results.

>> Please note that with appendices the investigation report is >1" thick at
>> this point. So, in addition to the detailed information provided in
>> this
>> report, we will be working on a
>> brief 1 to 2 page summary of the investigation, results, and key findings
>> /
>> implications that you can present to the public.

>> Please review the attached documents and I will attempt to call you later
>> today or Thursday morning to discuss comments.

>> Thanks. Mark.

>>
>> (See attached file: Analytical results.xls) (See attached file: DRAFT FED
>> LF
>> Prelim Investigation Letter Report.doc)

>> Mark J. Brose, PE | Principal
>> Senior Environmental Engineer
>> SEH
>> 421 Frenette Drive, Chippewa Falls, WI 54729

>> 715.720.6236 (direct / voicemail)
>> 715.271.7501 (mobile phone)
>> 800.472.5881 (toll free office)
>> 715.720.6300 (office fax)
>> mbroses@sehinc.com (e-mail)
>> www.sehinc.com (website)
>>
>>
>

Table 1
Field Monitored Landfill Gas Results

DRAFT TABLE

Analytical Parameters	Exposure Limits										Sampling Date/Location				
	OSHA PEL					NIOSH REL									
	TWA	C	ST	OSHA STEL	TWA	C	ST	IDLH	LEL	SEEP 1 Directly Above Gas Bubbles	SEEP 1 Breathing Zone	SEEP 2	SEEP 3	SEEP 4	SEEP 5
FIELD SCREENING* (GAS VAPORS ppm)															
Hydrogen Cyanide	NSE	NSE	10 (gas absorbed through skin)	NSE	4.7 (gas absorbed through skin)	NSE	NSE	NSE	50 (inhalation)	5.6%/56,000 ppm	>200	18	ND	ND	ND
Hydrogen Sulfide	20	20	NSE	50 ppm	NSE	20	50/10 Min.	100	4.0%/40,000 ppm	ND	ND	ND	ND	ND	ND
Methane	NSE	NSE	NSE	NSE	NSE	NSE	NSE	NSE	5.0%/50,000 ppm	40,000	ND	ND	ND	ND	ND
VOCs	NSE	NSE	NSE	NSE	NSE	NSE	NSE	NSE	varies	—	—	—	—	—	—
Acrylonitrile	2 ppm (inhalation)	10/15 Min. (skin)	NSE	10 ppm (inhalation)	1	10/15 Min. (skin)	nse	85 (inhalation)	3.0%/30,000 ppm	>20	>20	ND	ND	ND	ND

Analytical Parameters	Exposure Limits										Sampling Date/Location					
	OSHA PEL					NIOSH REL										
	TWA	C	ST	OSHA STEL	TWA	C	ST	IDLH	LEL	Seep 1 Collected Gas*	SEEP 1 Breathing Zone	MW-A Gas From Auger During Drilling	MW-A Breathing Zone	MW-B Gas From Auger During Drilling	MW-B prior gas collection	MW-B Breathing Zone
FIELD SCREENING* (GAS VAPORS)	NSE	NSE	10 (gas absorbed through skin)	NSE	4.7 (gas absorbed through skin)	NSE	NSE	50 (inhalation)	5.6%/56,000 ppm	>200	86	<1	<1	>200	146	6
	20	20	NSE	50 ppm	NSE	20	50/10 Min.	100	4.0%/40,000 ppm	348	83	<1	<1	76	96	<1
	NSE	NSE	NSE	NSE	NSE	NSE	NSE	NSE	5.0%/50,000 ppm	40,000	ND	ND	ND	ND	>50,000	ND
	NSE	NSE	NSE	NSE	NSE	NSE	NSE	NSE	varies	97	3 to 8	68	<1	10	ND	<1
	2 ppm (inhalation)	10/15 Min. (skin)	NSE	10 ppm (inhalation)	1	10/15 Min. (skin)	nse	85 (inhalation)	3.0%/30,000 ppm	>20	>20	<1	<1	--	--	--

Analytical Parameters	Exposure Limits										Sampling Date/Location			
	OSHA PEL					NIOSH REL								
	TWA	C	ST	OSHA STEL	TWA	C	ST	IDLH	LEL	PZ-B Gas From Auger During Drilling	PZ-B Breathing Zone	MW-C Gas From Auger During Drilling	MW-C Breathing Zone	
FIELD SCREENING* (GAS VAPORS)														
Hydrogen Cyanide	NSE	NSE	10 (gas absorbed through skin)	NSE	4.7 (gas absorbed through skin)	NSE	NSE	50 (inhalation)	5.6%/56,000 ppm	>200	4	<1	<1	<1
Hydrogen Sulfide	20	20	NSE	50 ppm	NSE	20	50/10 Min.	100	4.0%/40,000 ppm	<1	<1	<1	<1	<1
Methane	NSE	NSE	NSE	NSE	NSE	NSE	NSE	NSE	5.0%/50,000 ppm	ND	ND	ND	ND	ND
VOCs	NSE	NSE	NSE	NSE	NSE	NSE	NSE	NSE	varies	4	<1	<1	<1	<1
Acrylonitrile	2 ppm (inhalation)	10/15 Min. (skin)	NSE	10 ppm (inhalation)	1	10/15 Min. (skin)	nse	85 (inhalation)	3.0%/30,000 ppm	—	—	—	—	—
NSE = No standard established (Exposure limits for VOCs are compound specific and the V RAE 5 gas meter does not distinguish between compounds) OSHA PEL = Permissible Exposure Limit; TWA = Time Weighted Average over an 8-hour workshift; C = Ceiling concentration must not be exceeded during any part of the workday; ST = Short Term (15 minute) TWA exposure limit that should not be exceeded at any other time during a workday; Maximum Peak in any 15 minute shift means that a 15 minute exposure above the ceiling value, but never above the maximum peak, is allowed in any 15 minute timeframe during an 8-hour workday, unless otherwise noted. NIOSH REL = Recommended exposure limit; TWA = Time Weighted Average over a 10-hour workshift during a 40-hour workweek; C = Ceiling concentration must not be exceeded during any part of the workday; ST = Short Term (15 minute) TWA exposure limit that should not be exceeded at any other time during a workday; IDLH = Immediately Dangerous to Life or Health concentration 1 = V RAE 5 gas meter and Acrylonitrile detecting Draeger tubes were used to field screen gas bubbles emerging from Seep 1 location, as well as from inside the auger during drilling, and from the breathing zone during well installation. Acrylonitrile detecting Draeger tube exceeded its maximum reading of 20 ppm, however several cross sensitivities may exist in the gas vapors and may lead to false positive readings. 2 = Gas was allowed to collect in a large polyethylene funnel prior to field screening Compiled by: BLK V:\NOI\Landfill\Gas\analytical results.xls														

Table 2
Leachate Seep Analytical Results

Analytical Parameters	EPA MAXIMUM CONTAMINANT LEVELS	IDEM CLOSURE LEVELS FOR INDUSTRIAL SITES		SAMPLING DATE/ LOCATION
		INDUSTRIAL	DEFAULT CLOSURE LEVEL	
	MCL			7/26/06
ANALYTICAL DATA¹				
SEMIVOLATILE ORGANICS(µg/l)				
Acenaphthene	NSE	6,100	4,200	5.72
Carbazole	NSE	140	140	13.7
Fluorene	NSE	4,100	2,000	4.12
2-Methyl Naphthalene	NSE	410	410	6.13
Naphthalene	NSE	2,000	2,000	57.8
Phenanthrene	NSE	310	310	4.59
2-Nitrophenol	NSE	NSE	NSE	26.1
VOCs (µg/l)				
Benzene	5	52	52	2.2
p-Isopropyltoluene	NSE	NSE	NSE	0.8
Naphthalene	NSE	2,000	2,000	63
Toluene	1,000	8,200	8,200	1.6
1,2,4 Trimethylbenzene	NSE	5,100	5,100	1.2
Total Xylenes	10,000	20,000	20,000	3
ORGANOCHLORINE PESTICIDES (µg/l)				
Dieldrin	NSE	0.18	0.18	<0.2
Methoxychlor	40	510	45	<0.3
PCBs ² (µg/l)	5	1.4	1.4	<0.10
GENERAL CHEMISTRY (µg/l)				
Cyanide, Free	200	2,000	2,000	250
Phenols	NSE	31,000	31,000	53.8
INORGANICS (µg/l)				
Arsenic	10	1.9	10	87
Barium	2,000	20,000	20,000	1200
Cadmium	5	51	51	4.4
Chromium ³	100	310	310	120
Lead	15	42	42	150
Mercury	2	31	31	<0.065

0.0 = Exceeds IDEM RISC Default Closure Level

¹ = Analytical list is not complete. All samples were analyzed for VOCs+acrylonitrile, SVOCs, Pesticides, PCBs, Total Phenols, Total Cyanide, Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver. However, only those analytes detected on site are listed in the table.

² = V RAE 5 gas meter and Acrylonitrile detecting Draeger tubes were used to field screen gas bubbles emerging from Seep 1 location. 18 ppm hydrogen cyanide was measured near liquid level. 200 ppm was measured from gas produced when liquid was placed in hydrochloric acid preserved VOC vials. Acrylonitrile detecting Draeger tube exceeded its maximum reading of 20 ppm.

³ = PCB are listed as total PCBs on the IDEM RISC Technical Guide (there is no distinction between PCB 1016, 1221, 1232, 1242, 1248, 1254, 1260, or 1268) therefore, the highest detection limit was used in the result column.

⁴ = If chromium is not determined to be either trivalent or hexavalent through laboratory analysis, total chromium must be assumed hexavalent
Compiled by: BAL Checked by: MFR
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Table 3
Soil at Seep Locations Analytical Results

Analytical Parameters	IDEM RISC INDUSTRIAL CLOSURE LEVELS					Sampling Date/Location				
	Construction	Soil Direct Contact	Migration to Groundwater	Default Closure Level		7/26/06	SEEP 2	SEEP 3	SEEP 4	SEEP 5
ANALYTICAL DATA¹										
SEMIVOLATILE ORGANICS (µg/kg)										
Acenaphthene	50,000,000	24,000,000	1,200,000	1,200,000			<1990	<452	<446	<398
Carbazole	31,000,000	690,000	20,000	20,000			<1990	<452	<446	<398
Di-n-octyl phthalate	89,000,000	49,000,000	14,000,000	760,000			<1,990	833	<446	<398
Fluorene	33,000,000	16,000,000	1,100,000	1,100,000			<1,990	<452	<446	<398
2-Methyl Naphthalene	3,000,000	1,600,000	92,000	42,000			<1,990	<452	<446	<398
Naphthalene	17,000,000	8,000,000	170,000	170,000			<1,990	<452	<446	<398
Phenanthrene	2,500,000	1,200,000	170,000	170,000			<1,990	<452	<446	<398
2-Nitrophenol	NSE	NSE	NSE	NSE			<1,990	<452	<446	<398
VOCs (µg/kg)										
Benzene	560,000	14,000	350	350			<30	<34	<34	<30
p-Isopropyltoluene	NSE	NSE	NSE	NSE			<30	<34	<34	<30
Naphthalene	17,000,000	8,000,000	170,000	170,000			<60	<69	<68	<60
Toluene	49,000,000	16,000,000	96,000	96,000			<30	<34	<34	<30
1,2,4 Trimethylbenzene	920,000	170,000	780,000	170,000			<30	<34	<34	<30
Total Xylenes	4,800,000	890,000	430,000	170,000			<100	<120	<110	<100
ORGANOCHLORINE PESTICIDES (µg/kg)										
Dieldrin	39,000	860	150	150			<0.598	4.65	<0.600	<0.589
Methoxychlor	4,400,000	2,500,000	180,000	180,000			2.99	4.99	<2.30	5.23
PCBs (µg/kg)²										
GENERAL CHEMISTRY (µg/kg)	16,000	5,300	18,000	5,300			<301	<342	<338	<301
Cyanide	23,000,000	31,000,000	9,600	9,600			<600	<690	<680	<600
Phenols	230,000,000	96,000,000	160,000	160,000			<602	<685	<676	<602
INORGANICS (µg/kg)										
Arsenic	320,000	20,000	5,800	5,800			7,200	7,300	6,400	8,300
Barium	220,000,000	230,000,000	17,000,000	10,000,000			31,000	45,000	74,000	51,000
Cadmium	590,000	990,000	77,000	77,000			260	220	870	450
Chromium	3,400,000	650,000	120,000	120,000			9,300	11,000	17,000	11,000
Lead	970,000	13,000,000	230,000	230,000			21,000	57,000	20,000	40,000
Mercury	340,000	470,000	32,000	32,000			18	28	51	18

0.0 = Exceeds IDEM RISC Default Closure Level

ND = Not detected with field instruments

¹ = Analytical list is not complete. All samples were analyzed for VOCs+acrylonitrile, SVOCs, Pesticides, PCBs, Total Phenols, Total Cyanide, Arsenic, Barium, Cadmium, Chromium, Lead, Mercury.

²=PCB are listed as total PCBs on the IDEM RISC Technical Guide (there is no distinction between PCB 1016, 1221, 1232, 1242, 1248, 1254, 1260, or 1268) therefore, the highest detection limit was

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Table 4
Landfill Gas Analytical Results

Analytical Parameters	CAS No.	Exposure Limits (ppm)						Sampling Location/Sampling Date	
		OSHA PEL			NIOSH REL			MW-B GAS	Seep 1 GAS
		TWA	C	ST	Maximum Peak	TWA	C	ST	IDLH
VOCs (ppmV) ¹									
1,1-Dichloroethane	75-34-3	100	NSE	NSE	NSE	100	NSE	NSE	3,000
1,2,4-Trichlorobenzene	120-82-1	NSE	NSE	NSE	NSE	NSE	5	NSE	NSE
1,2,4-Trimethylbenzene	95-63-6	NSE	NSE	NSE	NSE	25	NSE	NSE	NSE
1,3,5-Trimethylbenzene	108-67-8	NSE	NSE	NSE	NSE	25	NSE	NSE	NSE
Benzene	71-43-2	1	NSE	5	NSE	0.1	NSE	1	500
Chloroethane	75-00-3	NSE	NSE	NSE	NSE	NSE	NSE	NSE	NSE
Dichlorodifluoromethane	75-71-8	1,000	NSE	NSE	NSE	1,000	NSE	NSE	15,000
Ethylbenzene	100-41-4	100	NSE	NSE	NSE	100	NSE	125	800
Methylene Chloride	75-09-2	25	NSE	125	2300	NSE	NSE	NSE	2,300
Styrene	100-42-5	100	200	NSE	600	50	NSE	100	700
Tetrachloroethene	127-18-4	100	200	NSE	300	NSE	NSE	NSE	150
Toluene	108-88-3	200	300	NSE	500 (10 Min./8 hours)	100	NSE	150	500
Trichloroethane	79-01-6	100	200	NSE	300 (5 Min./2 hours)	25	200 60 Min.	NSE	1,000
Trichlorofluoromethane	75-69-4	NSE	NSE	NSE	NSE	NSE	NSE	NSE	NSE
Vinyl Chloride	75-01-4	1	5 15 Min.	NSE	NSE	NSE	NSE	NSE	NSE
Xylene (M,P)	1330-20-7	100	NSE	150	NSE	100	NSE	NSE	900
Xylene (O)	95-47-6	100	NSE	150	NSE	100	NSE	NSE	900

¹ = Analytical list is not complete, only those analytes detected are listed in the table.

² = V RAE 5 gas meter and Acrylonitrile detecting Draeger tubes were used to field screen gas bubbles emerging from Seep 1 location. 18 ppm hydrogen cyanide was measured near liquid level. 200 ppm was measured from gas produced when liquid was placed in hydrochloric acid preserved VOC vials. Acrylonitrile detecting Draeger tube exceeded its maximum reading of 20 ppm.

NSE = No standard established

OSHA PEL = Permissible Exposure Limit; TWA = Time Weighted Average over an 8-hour workshift; C = Ceiling concentration must not be exceeded during any part of the workday; ST = Short Term (15 minute) TWA exposure limit that should not be exceeded at any other time during a workday; Maximum Peak in any _ minute timeframe during an 8-hour workday, unless otherwise noted.

NIOSH REL = Recommended exposure limit; TWA = Time Weighted Average over a 10 hour workshift during a 40-hour workweek; C = Ceiling concentration must not be exceeded during any part of the workday; ST = Short Term (15 minute) TWA exposure limit that should not be exceeded at any other time during a workday; IDLH = Immediately Dangerous to Life or Health concentration

Compiled by: BAL Checked by: BLK
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Table 5
Potable Well Analytical Results

Analytical Parameters	EPA MAXIMUM CONTAMINANT LEVEL	IDEM RISC RESIDENTIAL CLOSURE LEVELS		SAMPLING DATE/ LOCATION	
		RESIDENTIAL	DEFAULT CLOSURE LEVEL	9/6/06	9/6/06
	MCL			Bales Private Well	Fritz Private Well
ANALYTICAL DATA¹					
SEMIVOLATILE ORGANICS (µg/l)					
Acenaphthene	NSE	460	460	<1.4	<1.4
Fluorene	NSE	310	310	<1.3	<1.3
2-Methyl Naphthalene	NSE	31	31	<1.5	<1.5
Naphthalene	NSE	8.3	8.3	<2.1	<2.1
Phenanthrene	NSE	23	23	<1.2	<1.2
VOCs (µg/l)					
Benzene	5	5.5	5	<0.50	<0.50
Naphthalene	NSE	8.3	8.3	<0.50	<0.50
Toluene	1,000	2,400	1,000	<0.50	<0.50
1,2,4 Trimethylbenzene	NSE	16	16	<0.50	<0.50
Total Xylenes	10,000	270	10,000	<1.5	<1.5
ORGANOCHLORINE PESTICIDES (µg/l)					
Dieldrin	NSE	0.053	0.053	<0.038	<0.038
Methoxychlor	40	180	40	<0.052	<0.052
PCBs ² (µg/l)	0.5	0.43	0.5	<1.0	<1.0
GENERAL CHEMISTRY (µg/l)					
Cyanide	200	730	200	<10	<10
Phenols	NSE	11,000	11,000	<10	<10
INORGANICS (µg/l)					
Arsenic	10	0.57	10	5	<3.8
Barium	2,000	7,300	2,000	160	150
Cadmium	5	18	5	<0.30	<0.30
Chromium	100	110	100	<0.66	<0.66
Lead	15	15	15	<1.6	<1.6
Mercury	2	11	2	<0.13	<0.13

NSE = No standard established
 OSHA PEL = Permissible exposure limit-averaged over an 8 hour workshift
 OSHA STEL = Short term exposure limit-over a 15 minute time period
 NIOSH IDLH = Immediately dangerous to life or health
 NIOSH REL = Recommended exposure limit-averaged over an 8 hour workshift
 0.0 = Exceeds IDEM RISC Default Closure Level
 1 = Analytical list is not complete. All samples were analyzed for VOCs+acrylonitrile, SVOCs, Pesticides, PCBs.
 2 = PCB are listed as total PCBs on the IDEM RISC Technical Guide (there is no distinction between PCB 1016, 1221, 1232, 1242, 1248, 1254, 1260, or 1268) therefore, the highest detection limit was used in the result column.
 Compiled by: BAL Checked by: MFR

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Table 6
Groundwater and Surface Water Analytical Results

Analytical Parameters	EPA MAXIMUM CONTAMINANT LEVEL	IDEM RISC VALUES FOR GROUNDWATER AT INDUSTRIAL SITES		SAMPLING DATE/ LOCATION							
		MCL	INDUSTRIAL	DEFAULT CLOSURE LEVEL	MW-A	MW-B	PZ-B	MW-C	North Ditch	South Ditch	
ANALYTICAL DATA											
SEMIVOLATILE ORGANICS(µg/l)											
Acenaphthene	NSE	6,100	4,200	<0.054	<0.054	<0.054	<0.054	<0.14	<0.054	<0.054	<0.054
Fluorene	NSE	4,100	2,000	<0.043	<0.043	<0.043	<0.043	<0.11	<0.043	<0.043	<0.043
2-Methylnaphthalene	NSE	410	410	<0.061	<0.061	<0.061	<0.061	<0.061	<0.061	<0.061	<0.061
Naphthalene	NSE	2,000	2,000	<0.069	<0.069	<0.069	<0.069	0.71	0.24	<0.069	<0.069
Phenanthrene	NSE	310	310	<0.087	<0.087	<0.087	<0.087	<0.22	<0.087	<0.087	<0.087
VOCs (µg/l)											
Benzene	5	52	52	<0.22	0.81	<0.22	<0.22	10	<0.22	<0.22	<0.22
2-Butanone (MEK)	NSE	61,000	61,000	0.59	1.4	<0.39	<0.39	<3.9	<0.39	<0.39	<0.39
Carbon disulfide	NSE	10,000	10,000	<0.29	1.8	<0.28	<0.28	<2.8	<0.28	<0.28	<0.28
Chloroethane	NSE	990	990	<0.24	<0.24	<0.24	<0.24	24	<0.24	<0.24	<0.24
Chloromethane	NSE	120	120	<0.22	0.37	<0.22	<0.22	<0.14	<0.14	<0.14	<0.14
1,4-dichlorobenzene	75	10,000	10,000	<0.19	<0.19	<0.19	<0.19	2.2	<0.22	<0.22	<0.24
Ethylbenzene	700	10,000	10,000	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19	<0.19
Methylene Chloride	5	380	380	<0.19	<0.19	<0.19	<0.19	39	<0.19	<0.19	<0.19
Toluene	1,000	8,200	8,200	0.69	0.38	<0.17	<0.17	1.8	<0.17	<0.17	<0.17
Trichlorofluoromethane	NSE	NSE	NSE	<0.16	<0.16	<0.16	<0.16	3.7	<0.16	<0.16	<0.16
Total Xylenes	10,000	20,000	20,000	<0.44	<0.44	<0.44	<0.44	14	<0.44	<0.44	<0.44
ORGANOCHLORINE PESTICIDES (µg/l)											
alpha-BHC	NSE	0.45	0.45	<0.0062	<0.0062	0.0093	0.0093	0.011	<0.0062	<0.0062	<0.0062
beta-BHC	NSE	1.6	1.6	<0.0068	0.027	0.012	0.012	0.033	<0.0068	<0.0068	<0.0068
delta-BHC	NSE	NSE	NSE	<0.0064	<0.0064	<0.0064	<0.0064	0.018	<0.0064	<0.0064	<0.0064
gamma-BHC (Lindane)	0.2	2.2	2.2	<0.0062	<0.0062	<0.0062	<0.0062	0.0096	<0.0062	<0.0062	0.014
alpha-Chlordane	2.0	8.2	8.2	<0.0073	0.012	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073	<0.0073
4,4'-DDD	NSE	12	12	<0.0085	<0.0085	<0.0085	<0.0085	0.024	<0.0085	<0.0085	<0.0085
4,4'-DDT	NSE	8.4	8.4	<0.0086	<0.0086	0.011	0.011	0.018	<0.0086	<0.0086	<0.0086
Dieldrin	NSE	0.18	0.18	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067
Endrin	40	510	45	<0.0074	0.018	<0.0074	<0.0074	<0.0074	<0.0074	<0.0074	<0.0074
Methoxychlor	3	2.6	3	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Toxaphene	1	1.4	1.4	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33
PCBs ² (µg/l)	1	1.4	1.4	0.22	0.24	0.23	0.23	<0.49	0.27	0.34	0.34
GENERAL CHEMISTRY (µg/l)											
Cyanide	200	2,000	2,000	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4
Phenols	NSE	31,000	31,000	27	28	21	21	29	29	29	<0.017
INORGANICS (µg/l)											
Arsenic	10	1.9	10	16.8	38.8	7.2	7.2	5.5	<4.3	<4.3	<4.3
Barium	2,000	20,000	20,000	248	315	250	250	603	47.3	55.6	55.6
Cadmium	5	51	51	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42
Chromium	100	310	310	13.2	58.4	11.9	11.9	17.5	<1.6	<1.6	<1.6
Lead	15	42	42	6.7	61.5	11.6	11.6	20.3	<1.7	<1.7	<1.7
Mercury	2	31	31	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
Selenium	50	510	510	<2.4	5.9	<2.4	<2.4	4.6	<2.4	<2.4	<2.4
NSE = No standard established											
10 = Exceeds the Maximum Contaminant Level (MCL) set by the EPA											
1 = Analytical test is not complete. All samples were analyzed for VOCs+acrylonitrile, SVOCs, Pesticides, PCBs, Total Phenols, Total Cyanide, Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver. However, only those analytes detected are listed in the table.											
2 = PCBs are listed as total PCBs on the IDEM RISC Technical Guide (there is no distinction between PCB 1016, 1221, 1232, 1242, 1248, 1254, 1280, or 1298) therefore, the highest detection limit was used in the result column.											
Compiled by: <u>BAL</u> Checked by: <u>BLK</u>											

NSE = No standard established
 * = Exceeds the Maximum Contaminant Level (MCL) set by the EPA
 1 = Analytical list is not complete. All samples were analyzed for VOCs*acrylonitrile, SVOCs, Pesticides, PCBs, Total Phenols, Total Cyanide, Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, and Silver. However, only those analytes detected are listed in the table.
 2 = PCBs are listed as total PCBs on the IDEM RISC Technical Guide (there is no distinction between PCB 1016, 1221, 1232, 1242, 1248, 1254, 1260, or 1268) therefore, the highest detection limit was used in the result column.

Compiled by: BAL Checked by: BLK

Table 7
Sediment Analytical Results

Analytical Parameters	IDEM RISC VALUES FOR SOIL AT INDUSTRIAL SITES				Sampling Date/Location	
					9/6/06	9/6/06
	Construction	Soil Direct Contact	Migration to Groundwater	Default Closure Level	North Ditch	South Ditch
ANALYTICAL DATA ¹						
SEMIVOLATILE ORGANICS (µg/kg)						
Acenaphthene	50,000,000	24,000,000	1,200,000	1,200,000	21	37
Acenaphthylene	5,900,000	2,800,000	180,000	180,000	17	13
Anthracene	250,000,000	120,000,000	51,000	51,000	91	170
Benzo (a) anthracene	790,000	15,000	62,000	15,000	290	470
Benzo (b) pyrene	79,000	1,500	16,000	1,500	220	420
Benzo (b) Fluoranthene	790,000	15,000	74,000	15,000	350	590
Benzo (ghi) perylene	NSE	NSE	NSE	NSE	150	240
Benzo (k) fluoranthene	7,900,000	150,000	39,000	39,000	110	210
Chrysene	79,000,000	1,500,000	25,000	25,000	330	430
Fluoranthene	33,000,000	16,000,000	880,000	880,000	680	1,100
Fluorene	33,000,000	16,000,000	1,100,000	1,100,000	36	49
Indeno (1, 2, 3-cd) pyrene	790,000	15,000	3,100	3,100	120	240
1-Methylnaphthalene	NSE	NSE	NSE	NSE	46	23
2-Methylnaphthalene	3,300,000	6,600,000	42,000	42,000	57	41
Naphthalene	17,000,000	8,000,000	170,000	170,000	28	35
Phenanthrene	2,500,000	1,200,000	170,000	170,000	490	570
Pyrene	25,000,000	1,200,000	570,000	570,000	510	610
VOCs (µg/kg)						
Benzene	560,000	13,000	350	350	<0.34	<0.33
Carbon Disulfide	8,200,000	1,200,000	82,000	82,000	1.0	0.74
1,4-Dichlorobenzene	8,000,000	73,000	3,400	3,400	0.53	<0.49
Toluene	49,000,000	16,000,000	96,000	96,000	0.75	<0.42
1, 2, 4-Trichlorobenzene	8,900,000	4,900,000	77,000	77,000	0.73	<0.46
Total Xylenes	4,800,000	890,000	430,000	170,000	<1.1	<1.1
ORGANOCHLORINE PESTICIDES (µg/kg)						
alpha-BHC	120,000	4,000	24	24	<0.44	<8.7
beta-BHC	200,000	12,000	86	86	12	<12
delta-BHC	NSE	NSE	NSE	NSE	<0.54	<11
gamma-BHC (Lindane)	310,000	19,000	100	100	<0.50	<9.9
Endosulfan I	5,500,000	2,900,000	46,000	46,000	1.8	<9.6
4,4'-DDD	2,200,000	120,000	480,000	120,000	3.7	<14
4,4'-DDT	540,000	86,000	890,000	86,000	<0.59	<12
Dieldrin	39,000	860	150	150	<0.50	<9.9
Endrin Ketone	NSE	NSE	NSE	NSE	3.1	36
Methoxychlor	4,400,000	25,000,000	180,000	180,000	<0.75	<15
PCBs (µg/kg) ²	16,000	5,300	18,000	5,300	<22	25
GENERAL CHEMISTRY (µg/kg)						
Cyanide	23,000,000	31,000,000	9,600	9,600	<160	<160
Phenols	230,000,000	96,000,000	160,000	160,000	690	<300
INORGANICS (µg/kg)						
Arsenic	320,000	20,000	5,800	5,800	7,800	4,300
Barium	220,000,000	230,000,000	17,000,000	10,000,000	45,900	41,700
Cadmium	590,000	990,000	77,000	77,000	<40	<39
Chromium	3,400,000	650,000	120,000	120,000	10,000	9,800
Lead	970,000	13,000,000	230,000	230,000	19,000	25,800
Mercury	340,000	470,000	32,000	32,000	44	37
0.0 = Exceeds IDEM RISC Default Closure Level ND = Not detected with field instruments ¹ = Analytical list is not complete. All samples were analyzed for VOCs+acrylonitrile, SVOCs, Pesticides, PCBs, Total Phenols, Total Cyanide, Arsenic, Barium, Cadmium, ² =PCB are listed as total PCBs on the IDEM RISC Technical Guide (there is no distinction between PCB 1016, 1221, 1232, 1242, 1248, 1254, 1260, or 1268) therefore, the highest detection limit was used in the result column.						
Compiled by: <u>BAL</u> Checked by: <u>MFR</u>						

V:\KOILcswd\040100\analytical results.xls

October 27, 2006

RE: Feddeler Landfill
Preliminary Investigation Results

SEH No. LCSWD0401.00 14.00

DRAFT

Ms. Jeanette Romano
Lake County Solid Waste Management District
7820 Broadway
Merriville, IN 46410

Dear Ms. Romano:

Short Elliott Hendrickson, Inc. (SEH®) has completed this letter report on behalf of the Lake County Solid Waste Management District (LCSWMD) to document the preliminary investigation results for the Feddeler Landfill located in Lowell, Lake County, Indiana.

This letter report summarizes the IDEM file review, preliminary investigation of several seeps noted on the landfill, and subsequent preliminary investigation activities which included: monitoring well installation, groundwater sampling, gas sampling, sediment sampling, and private potable well sampling.

Reference the workplan, and followup discussions.

Background

Insert text from Workplan letter.

IDEM File Review

Insert from Workplan letter.

Methods of Investigation for Phase 1

During the initial site reconnaissance on April 24, 2006, three active leachate seeps were noted near the southwestern portion of the landfill; however, during the July 26 sampling event the only actively flowing seep was the largest seep (Seep 1, see attached figure) on the southern edge of the landfill. Soil samples were collected at the two previously active seep locations (Seep 2 and 3), as well as at two additional locations. The two additional sampling locations were chosen based on soil staining, dead vegetation, and obvious drainage patterns.

One active leachate seep sample and four inactive seep soil samples were collected to assess the potential impacts of contaminants to the environment at the Feddeler Landfill. Seeping liquid from

the Seep 1 sampling location was allowed to collect in a small pool prior to being transferred to the appropriate collection jars via peristaltic pump. Soil sample locations were chosen based on Soil samples were collected from the dry seep locations labeled Seep 2, Seep 3, Seep 4, and Seep 5 were collected from the 0 to 4 inch below grade interval and were transferred to the appropriate collection jars. All liquid and soil samples collected were analyzed for volatile organic compounds (VOCs) plus acrylonitrile, semi-volatile organic compounds (SVOCs), pesticides, total phenols, total cyanide, Resource Conservation and Recovery Act (RCRA) metals including: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver, and polychlorinated biphenyls (PCBs). Samples were packed in ice and shipped to Test America in Watertown, WI via FedEx on July 27, 2006.

Field monitoring for toxic vapors including hydrogen cyanide, carbon monoxide, hydrogen sulfide, methane, oxygen concentration was conducted with a V RAE 5 gas meter and acrylonitrile was field monitored by using an acrylonitrile detecting Draeger tubes Seep 1. Gas bubbles were observed emerging from the Seep 1 pool sampling location. Hydrogen cyanide (HCN) was detected at 18 ppm, which is well above the OSHA permissible exposure limit (PEL) of 10 ppm, and the NIOSH recommended exposure limit (REL) of 4.7ppm. Acrylonitrile was also detected at a greater than 20 ppm concentration at this location. This concentration is well above the PEL (2ppm), REL (1ppm), and the OSHA short term exposure limit (STEL) of 10ppm. HCN has a gas density of 0.94 (air =1) which is less than air meaning that it essentially "floats" in air. Acrylonitrile on the other hand, has a gas density almost twice that of air (1.8) and therefore "sinks" in air and tends to accumulate in low lying areas. Hydrogen cyanide and acrylonitrile detections in the ambient vapors near Seep 1 by the field monitoring equipment indicate that volatile contaminants may exist at depth and are being volatilized to produce toxic vapors. The acrylonitrile detection tubes have cross sensitivities with 1000 ppm acetone, 20 ppm benzene, 1000 ppm ethanol, 1000 ppm ethyl acetate, 10 ppm ethylbenzene, and 1000 ppm hexane. Also, the acrylonitrile reading will be lower in the presence of butadiene.

Phase 1 Analytical Results

Sample results from Seep 1 indicate that arsenic and lead concentrations in the liquid leachate currently seeping is present in a concentration that exceeds the EPA maximum contaminant level (MCL), the concentration permissible at industrial facilities, and the concentration allowable at the time site closure would be granted by IDEM. The cyanide concentration found at Seep 1 is present at a concentration that exceeds its MCL, but is below the permissible levels for industrial sites and closure decisions. Low levels of volatile organic compounds (VOCs), Semi volatile organic compounds (SVOCs), barium, cadmium, chromium, and phenols, were found in the liquid at Seep 1, but were below the permissible limits set by IDEM and the EPA. See attached tables summarizing the laboratory analyses performed.

Soil sample results from the dry Seeps 2, 3, 4, and 5 indicate that the barium concentration in the soil at these seep locations exceeds the IDEM soil direct contact, migration to groundwater, and the default closure levels. Di-n-octyl phthalate, an SVOC was detected at a level below the permissible limits set by IDEM. Additionally low levels of the organochlorine pesticides methoxychlor and

dieldrin were detected. In addition, arsenic, cadmium, chromium, lead, and mercury were found above laboratory detection limits, but were below the permissible limits set by IDEM.

Next Steps in Investigation

Based on the information discovered during Phase 1 of the investigation, SEH and LCSWMD concurred that the following data collection was necessary to further assess contaminant presence/absence:

- Potable well sampling in downgradient (SE-SW) direction
- Additional monitoring wells and piezometer in downgradient direction not cut off by Bruce Ditch
- Ambient air screening for personnel (or others on site) safety
- Gas analysis of subsurface vapors and vapors being emitted at the Seep 1 location
- Sample Bruce Ditch surface water and sediments up and down gradient of seeps entrances

Methods of Investigation for Phase 2

SEH performed an additional phase of investigation at the Feddeler Landfill site on September 6, 2006. The activities included installation of groundwater monitoring wells and one piezometer, well development, collection of groundwater and surface water samples, collection of sediment samples, collection of landfill gas samples, potable well sampling, and monitoring site air conditions for health and safety purposes.

Three groundwater monitoring wells (MW-A, MW-B, and MW-C) and one nested piezometer (PZ-B) were installed near the south side of the Feddeler Landfill. These monitoring points were installed by SCS Environmental Contracting of Fort Wayne, Indiana under the direction of an SEH hydrogeologist. Soil borings were blind-drilled at each location using 4 1/4" inside diameter hollow stem augers. Approximate subsurface conditions were recorded on soil boring logs based on auger cuttings and drilling rates. Once obviously saturated soils were encountered, the borings were instrumented with monitoring wells equipped with 10-foot slotted PVC screens. The nested piezometer was instrumented with a five-foot slotted screen positioned approximately 15 feet below the nested well and was located approximately 5 feet west of MW-B. All monitoring points were fitted with above-ground locked protective casings. Soil boring logs and well construction documentation are attached. The locations of the monitoring points are depicted on the attached draft Figure.

Upon completion of well installation, the monitoring points were developed by removing several well volumes of groundwater from each well in order to remove suspended solids generated during well drilling. Well development consisted of surging the wells with a bailer and then purging water from the well. Once well development was completed, the wells were allowed to stabilize prior to sample collection.

Groundwater samples were collected from the three groundwater wells and one piezometer using disposable bailers. In addition, two surface water samples were collected from the intermittent creek located along the west side of the site. The sampling locations are provided on the attached figures. The groundwater and surface water samples were placed in laboratory provided bottles, appropriately preserved, and chilled to 4 degrees C. Chain-of-custody documentation was maintained throughout sample collection and shipment. The samples were delivered via overnight courier to Severn Trent Laboratories at three separate locations depending on the sample matrix in a given cooler.

Two sediment samples were collected from the bottom of the intermittent creek along the west side of the site. These samples were co-located with the surface water samples discussed in the previous paragraph. The sediment samples were collected from the upper six-inch layer of sediments by using sample dedicated disposable core samplers and by hand using disposable nitrile gloves. The sediment samples were placed in laboratory provided bottles, chilled to 4 degrees C., and delivered to Severn Trent Laboratories via overnight courier and standard chain-of-custody documentation.

Two landfill gas samples were collected from the site by SEH. One sample was collected from gas venting from well MW-B, and the second sample was collecting from gas venting from a point on the landfill surface. The gas discharge rate in MW-B was measured prior to sampling, and the landfill gas was then collected in a Summa canister at a flow rate equal to the discharge rate. The landfill gas at the Seep 1 location was collected by placing a large polyethylene funnel over the discharge and then collecting the sample from the top of the sealed funnel (discharge rate could not be measured at this location). The landfill gas samples were submitted to Severn Trent Laboratories for analysis. The location of Seep 1 is provided on the attached figure.

Two private potable wells located just south of the Feddeler Landfill were sampled by SEH during the field investigation. A potable water supply well serving a residence (consisting of a couple in their early 30s and one child approximately 9 months old) located at 10100 181st Street was sampled at a faucet within the residence. The faucet at this residence was after an in-line sediment trap that is part of the water supply system. The second well sampled supplies potable water to the Don Bales, Inc., an Implement dealer, located at 10102 181st Street. No traps or softeners were located between the faucet sampled and the well at this location. The potable water samples were placed directly in laboratory provided bottles, appropriately preserved, chilled to 4 degrees C, and delivered to Severn Trent Laboratories via overnight carrier with standard chain-of-custody documentation.

During field activities, SEH monitored air conditions immediately adjacent to sampling points, as well as in the breathing zone using a V-Rae five-gas meter, and a photoionization detector (PID). The five-gas meter was used to monitor concentrations of hydrogen sulfide, hydrogen cyanide, methane, oxygen, and to monitor the explosivity of the gas. The PID was used to monitor relative concentrations of volatile organic compounds (VOCs). Hydrogen cyanide was detected at concentrations up to 5 instrument units (roughly equivalent to parts per million) in the breathing zone while installing well MW-B, piezometer PZ-B, and adjacent to the natural landfill gas seep.

Site personnel implemented "Level C" respiratory protection (air purifying respirators) when hydrogen cyanide was detected above background concentrations in the breathing zone. VOCs and much higher concentrations of hydrogen cyanide (>200ppm) were detected adjacent to boreholes during drilling operations. These concentrations are recorded on the attached soil boring logs.

Phase 2 Analytical Results

Samples collected from the three newly installed groundwater monitoring wells and one nested piezometer, surface water and sediment samples from Bruce Ditch, sediment samples from Bruce Ditch, and potable wells from Don Bales and Fritz Dorge properties were analyzed by Severn Trent Laboratories, Inc. for VOCs plus acrylonitrile, semivolatile organic compounds (SVOCs), Polychlorinated biphenyls (PCBs), organochlorine pesticides, cyanide, phenols, and the RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury). The two gas samples collected were analyzed for VOCs plus Acrylonitrile. Analytical Data and data in table format are attached.

Sample results from the three newly installed monitoring wells indicate that benzene, methylene chloride, arsenic, and lead are present in groundwater at concentrations that exceed the EPA maximum contaminant levels (MCL). Arsenic and lead are present in groundwater in downgradient monitoring well locations MW-A and MW-B at concentrations that exceed IDEM RISC levels for Industrial and Default Closure criteria. Additionally, low levels of semivolatile organic compounds (SVOC), organochlorine pesticides, PCBs, phenols, barium, chromium, and selenium are present in the groundwater on site, but are present below the permissible levels for industrial sites.

Surface water samples were collected from two locations along Bruce Ditch. The northern-most sample was collected from a location labeled "North Ditch." This sample was collected from an artesian spring found flowing on September 9, 2006. The southern sample labeled "South Ditch" was sampled down stream from the Seep 1 location. Results from these samples do not indicate EPA MCL or IDEM RISC level exceedances for any substance we analyzed for. Arsenic was below the laboratory's detection limit at both locations. Lead was below its detection limit at the North Ditch location, and was below its MCL and IDEM RISC level at the South Ditch location. Gamma-BHC, naphthalene, PCBs, phenols, barium, and chromium, are present in the surface water on site, but are present below the permissible levels for industrial sites. Additionally, no VOCs were detected at either ditch location.

Sediment samples were collected from the ditch sample locations after the water was collected to minimize turbulence. Several SVOCs, VOCs, organochlorine pesticides, PCBs, phenols, barium, chromium, lead, and mercury were detected in concentrations below IDEM RISC values for Industrial sites. Arsenic is present in the North Ditch sediment sample at a concentration that exceeds the IDEM Migration to Groundwater and Default Closure Pathways. An elevated level of Arsenic is also present in the South Ditch sediment sample, but the concentration is below the IDEM permissible levels.

The gas samples collected from the Seep 1 location and from the MW-B location contained potentially lethal concentrations of both hydrogen cyanide and hydrogen sulfide, and explosive amounts of methane based on field monitoring equipment. Laboratory analysis of the gas samples indicates that many VOCs are present at levels below NIOSH and OSHA levels.

Laboratory from the Don Bales Inc. property potable well indicate that arsenic is present, however at concentrations below the MCL drinking water standards. Low levels of barium were also detected in the Fritz well and Bales well.

DISCUSSION

Based on historical analytical data from the IDEM file review, the arsenic levels found adjacent to the landfill and in the Don Bales potable well may not be naturally occurring background concentrations. Several downgradient monitoring wells (MW-2, MW-7, MW-9, MW-10, (MW-12, MW-13, and MW-14 are not on our site features map)) show that arsenic levels are below laboratory detection limits; however, these wells may be hydrogeologically cut off from the landfill contamination by Bruce Ditch. Also, two other monitoring wells that are not hydrogeologically cut off from Bruce Ditch (MW-8, which is likely locally downgradient, but regionally upgradient and MW-6, which is likely locally and regionally downgradient and not cutoff by Bruce Ditch) had levels of arsenic (14 µg/l and 13 µg/l, respectively during the June 2000 sampling event conducted by Weaver, Boos, and Gordon, Inc.) that exceed the current EPA MCL, industrial, and Default Closure Levels for industrial sites. Additionally, Seep 1 leachate; Seep 2, Seep 3, Seep 4, and Seep 5 soil samples; North Ditch and South Ditch sediment samples all have high arsenic concentrations.

DRAFT

BAL//MJB

C:

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

INDIANAPOLIS

OFFICE MEMORANDUM

Date: June 25, 2004

To: Hamid Masood
OLQ Permit Geology Section

Thru: James Risch JR 6-25-04
Barry Steward CB for BRS

From: James P. Caylor JPC 6-25-04
OLQ Chemistry Section

Subject: Analytical Results for Feddeler CD Site
Lowell, Lake County, Indiana
Site ID# 45-08
Sampled: May 19, 2004
Sample Numbers: LQ1344 – LQ1350
Applied Research & Development Laboratory

The analytical results for the samples identified above have been evaluated. The data was validated in accordance with the quality criteria contained in BAA-003, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) Third Edition, and EPA Methods for Chemical Analysis of Water and Waste. Based on the evaluation, it has been determined that the results are acceptable for use. Any exceptions or qualifications to the acceptance of these results will be identified in this memorandum. This memorandum should remain attached to the original laboratory reports for reference.

General Comments:

The purpose of this event was to investigate the groundwater at the site to compare the concentrations of contaminants present to drinking water maximum contaminant levels (MCL) or secondary drinking water regulation (SDWR). The collected samples were analyzed for volatile organic compounds (VOCs), dissolved RCRA metals plus dissolved iron, manganese, and sodium, and general chemistry parameters including ammonia-N, nitrate/nitrite, specific conductance, sulfate, total dissolved solids (TDS), total solids (TS), and total phenolics. The project goal was achieved.

Sampling Quality Assurance/Quality Control:

Field documentation did allow for interpretation of the above referenced data.

The field duplicate samples are used to establish the representativeness of field sampling (i.e., the homogeneity and sample variability). Field duplicate (LQ1346) was collected from MW-2 and the results showed good agreement for all parameters.

Field blanks (trip and/or equipment) are used to determine sample contamination resulting from field sampling equipment, sample containers, chemical preservative, and handling and transportation of samples.

An equipment blank was collected from the filtration device and analyzed for metals. No metals were detected in the blank.

A trip blank was collected and analyzed for VOCs. No VOCs were detected in the blank.

The lid for sample LQ1348 for phenolics was broken in shipment and sample was not analyzed for phenolics.

Laboratory Quality Assurance/Quality Control:

The laboratory provided all quality assurance/quality control (QA/QC) documentation required for the validation of the analytical results for this sampling event. The following qualifiers were found when validating the analytical results.

Volatile Organic Compounds:

The groundwater samples were analyzed for VOCs using SW-846 Method 8260B and the QA/QC documentation indicated the analysis was in control.

The surrogate spike recoveries for toluene-d8 (111% to 118%), 1, 2-dichloroethane (115% to 124%), and 4-bromofluorobenzene (116%) were slightly higher than the upper limits established by BAA-003 (110%, 114%, and 115%, respectively). However, VOCs were not detected in the samples and slightly high surrogate recoveries will not affect the analytical results.

General Chemistry:

The groundwater samples were analyzed for general chemistry parameters including ammonia-N using EPA Water Method 350.1; conductivity by meter; nitrate/nitrite by EPA Water Method 353.1; sulfate by ARDL Method TT23; TDS by EPA Water Method 160.1; TS by EPA Water Method 160.3; and total phenolics by EPA Water Method 420.2. The QA/QC documentation indicated the analyses were in control.

The method blank for TDS contained a concentration of 19 mg/L. This concentration is approximately twice the reporting limit. However, the lowest concentration in a sample (LQ1344 = 453 mg/L) is greater than twenty times the concentration in the method blank. The analytical results for this sampling event are not affected.

Metals:

The groundwater samples were analyzed for metals by using SW-846 Method 6010C and mercury by using SW-846 Method 7470A.

The ICP Interference Check Sample Analysis for sodium was out of control high (126.5% and 151.0%). The Interference Check Sample was rerun with similar results (151.1% and 124.9%). This indicates that there may be an interference with the sodium analytical results that may cause a high bias. The analytical results for sodium are estimated biased high.

The matrix spike/matrix spike duplicate (MS/MSD) recoveries for selenium are out of control, high (130.4% and 128.5%, respectively). However, selenium was not detected in the samples and slightly high MS/MSD recoveries will not affect the analytical results.

The serial dilution for sodium was out of control (55.5% difference). Refer to the comment in this section denoting that there may be an interference with the sodium analysis. The analytical results are estimated.

Results:

General Chemistry:

The concentration of TDS exceeds the SDWR of 500 mg/L in samples LQ1345 (1,500 mg/L), LQ1347 (830 mg/L), and LQ1348 (790 mg/L).

The field pH exceeds the SDWR limits of 6.5 to 8.5 in sample LQ1344 (11.5).

Metals:

The concentration of arsenic exceeds the MCL of 0.010 mg/L in samples LQ1344 (0.022 mg/L), LQ1345 (0.013 mg/L), LQ1347 (0.013 mg/L), and LQ1348 (0.023 mg/L).

The concentration of iron exceeds the SDWR of 0.3 mg/L in samples LQ1344 (1.3 mg/L), LQ1345 (8.0 mg/L), and LQ1348 (0.71 mg/L).

The concentration of manganese exceeds the SDWR of 0.05 mg/L in samples LQ1344 (0.068 mg/L), LQ1345 (0.076 mg/L), LQ1347 (0.11 mg/L), and LQ1348 (0.15 mg/L).

Conclusion:

The analytical results are acceptable for use with the above qualifications noted.

Attachments

SITE AND SAMPLING INFORMATION

Site Name:	Feddeler CD Site
Site Number:	45-08
Location:	Lowell, Lake County, Indiana
Date Sampled:	19-May-04
Date Reported:	18-Jun-04
Sample Numbers:	LQ1344 - LQ1350
Lab:	Applied Research & development Laboratory

Push Button to Print Page:

RCRA Metals & Primary Standards

Metals Secondary Standards

General Chemical Analysis

Volatile Organic Analysis

Semi-volatile Organic Analysis

PCBs/Pesticides/Herbicides

TCLP Metals

[illegible]

Volatile Organic Analysis

Site Name:	Feddeler CD Site	Water
Site Number:	45-08	
Location:	Lowell, Lake County, Indiana	
Date Sampled:	19-May-04	
Date Reported:	18-Jun-04	
Sample Numbers:	LQ1344 - LQ1350	
Lab:	Applied Research & development Laboratory	UNITS: ug/L

[illegible]

* BLANK (Type indicated)
 ** FIELD DUPLICATE
 Empty Box indicates NON-DETECTABLE
 NR = NOT RUN NA=NOT AVAILABLE
 Estimated
 Bold = above MCL level

[illegible]

Empty Box indicates NON-DETECTABLE	Estimated	Bold = above MCL or SDWR
* BLANK (Type indicated)		
** FIELD DUPLICATE		
MCL # = Maximum Contaminant Level		
SDWR ## = Secondary Drinking Water Regulations		
***Field ph determined with pH strip		

[illegible]

* BLANK (Type indicated)	Empty Box indicates NON-DETECTABLE	Estimated	Bold = above MCL or SDWR or action level
*** FIELD DUPLICATE	NR = NOT RUN	NA=NOT AVAILABLE	
MCL # = Maximum Contaminant Level			
SDWR ## = Secondary Drinking Water Regulations			



INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

We make Indiana a cleaner, healthier place to live.

Frank O'Bannon
Governor

Lori F. Kaplan
Commissioner

August 31, 2004

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Mr. Jeffery Langbehn
Lake County Solid Waste District
7820 Broadway
Merrillville IN 46410

Dear Mr. Langbehn:

RE: Review of Ground Water Sampling Results
Event of May 19, 2004
Feddlers CD Landfill
Lake County

Staff of the Geology and Chemistry Sections visited the Feddlers CD landfill on May 19, 2004 to sample four existing monitoring wells. The samples were sent to one of the IDEM's contract laboratories (Applied Research and Development Laboratory) for analysis. The standard chain of custody and quality control procedures were followed.

The purpose of the sampling was to investigate the ground water at the landfill and for comparison to drinking water maximum contaminant levels (MCL) or secondary maximum contaminant levels (SMCL). The collected samples were analyzed for: volatile organic compounds (VOC's); dissolved RCRA metals; dissolved iron; dissolved manganese and dissolved sodium. In addition, testing involved general chemistry parameters including: ammonia-N; nitrate/nitrite; specific conductance; sulfate; total dissolved solids (TDS) and total phenolics.

Following is a table summarizing the constituents of concern. No VOC's were detected.

Well*	PH	TDS	Arsenic	Iron	Manganese
MW-1	11.5**	453	0.022	1.3	0.068
MW-2	6.3	1500	0.013	8.0	0.076
MW-4	6.0	1100	0.013	0.71	0.15
MW-13	6.0	820	0.023	0.20	0.11
SMCL	6.5-8	500		0.3	0.05
MCL			0.05***		

**Standard Unit

Units: Mg/L

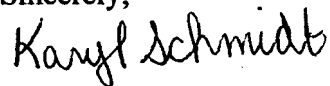
* MW-1 is up-gradient. MW-2, 4 and 13 are considered down-gradient.

Mr. Jeffery Langbehn
Lake County Solid Waste District
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*** Please note that dissolved arsenic has not been detected over the 0.05 MCL. However, as of January 2006, MCL for Arsenic will be reduced to 0.01 mg/l.

Please contact the project Geologist Hamid Masood at 317-232-4300 or email hmasood@dem.state.in.us if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Karyl Schmidt".

Karyl Schmidt, L.P.G.
Chief, Geology Section
Permits Branch
Office of Land Quality

cc: Lake County Health Department

bcc:

David Becka

Hamid Masood

Karyl Shemidt

Bob Lamprecht

Bruce Palin